ORDER NO. KMS0304724C1

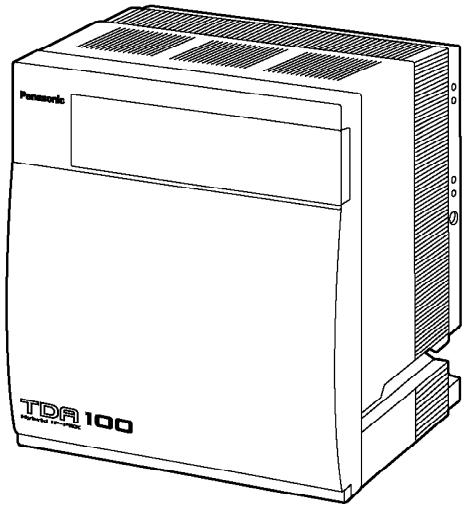
F19

Service Manual

Hybrid IP-PBX

KX-TDA100

(for U.S.A.)



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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number, write down all of the 11 digits. The serial number may be found on the unit.

Panasonic

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.

Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

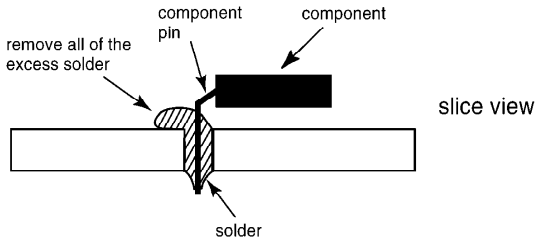
When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.
We will use PbF when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

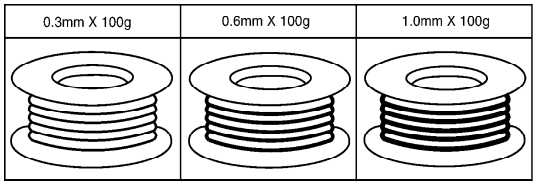
- **PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.**
- **PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).**
- **If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.**
- **When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).**



1.1. SUGGESTED PbF SOLDER

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper,

(Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufac
turer's specific instructions for the melting points of their products and any precautions for using their product with other
materials.
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.



1.2. HOW TO RECOGNIZE THAT Pb FREE SOLDER IS USED

2. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch IC or LSI pins with bare fingers.

3. CAUTION

3.1. NOTE

When you note the serial number, write down all of the 11 digits.
The serial number may be found on the label affixed to the bottom of the unit.

3.2. SAFETY PRECAUTIONS

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or

damage is evident.

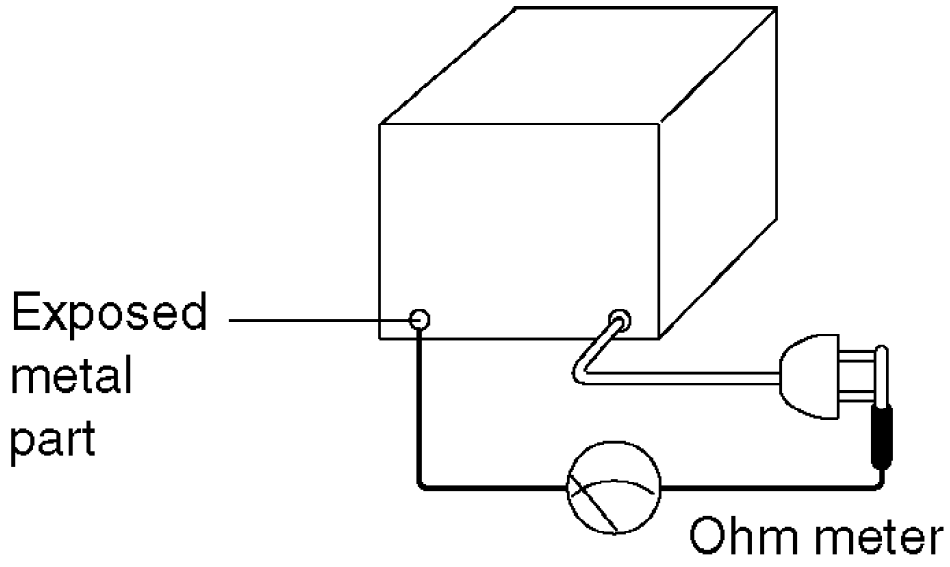
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

3.3. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw threads, control shafts, handle brackets, etc.

Note:
Some exposed parts may be isolated from the chassis by design. These will read infinity.

4. If the measurement is outside the specified limits, there is a possibility of shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.



Resistance = more than 1MΩ (at DC 500 V)

3.4. BATTERY CAUTION

1. **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's Instructions.**
2. **The lithium battery is a critical component (type No.CR23541). Please observe for the proper polarity and the exact location when replacing it and soldering the replacement lithium battery in.**

3.5. CAUTION

The power socket wall outlet should be located near this equipment and be easily accessible.

4. SPECIFICATIONS

4.1. GENERAL DESCRIPTION

Control Bus		**Original bus (16 bit, 8 MHz,10 megabytes per second)**
Communication Bus		**H.100 bus conformity (1024 time slot)**
Switching		**Non Blocking Distributed Time Switch**
Power Input	**PSU-S (KX-TDA0108)**	**100 V AC to 130 V AC/200 V AC to 240 V AC, 1.4 A/0.8 A, 50 Hz**
	PSU-M (KX-TDA0104)	**100 V AC to 130 V AC/200 V AC to 240 V AC, 2.5 A/1.4 A, 50 Hz**
Maximum Power Failure Tolerance		**300 ms**
Power Consumption	**KX-TDA100 with PSU-S**	**140 W, 1.4 A (at 120 V AC, 60 Hz)**
	KX-TDA100 with PSU-M	**210 W, 2.2 A (at 120 V AC, 60 Hz)**
Memory Backup Duration		**7 years**
Dialling	**CO Line**	**Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling**
	Extension	**Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling**
Mode Conversion		**DP-DTMF, DTMF-DP**
Ring Frequency		**20 Hz/25 Hz (selectable)**
Trunk Loop Limit		**1600 Ω maximum**
Operating Environment	**Temperature**	**0 °C to 40 °C (32°F to 104°F)**
	Humidity	**10%to 90% (non condensing)**
Conference Call Trunk		**From 10 x 3-party conference call to 4 x 8-party conference**
Music on Hold (MOH)		**2 ports (Level Control: -6 dB to +6 dB in 3 dB steps) MOH1: External Music Source port MOH2: Selectable Internal/External Music Source port**

Paging	Internal	Level Control: -6 dB to +3 dB in 3 dB steps	
	External	2 ports (Volume Control: -15 dB to +6 dB in 3 dB steps)	
Serial Interface Port	RS-232C	1 (max 115.2 kbps)	
	USB	1	
Extension Connection Cable		SLT	1 pair wire (T, R)
		DPT	1-pair wire (D1, D2) or 2-pair wire (T, R, D1, D2)
		APT	2-pair wire (T, R, D1, D2)
		DSS Consoles and Add-on Key Module	1-pair wire (D1, D2)
Dimension	KX-TDA100	334 mm (W) x 390 mm (H) x 270 mm (D) (13 1/3 in x 15 3/5 in x 10 4/5 in)	
Weight (when fully mounted)	KX-TDA100	Under 12 kg (26.4 lb)	

4.2. CHARACTERISTICS

Terminal Equipment Loop Limit	-PT: KX-T76xx series and KX-T7560/KX-T7565: 90 Ω; all other DPTs/APTs: 40 Ω -SLT: 600 Ω including set -Doorphone: 20 Ω -CS: 130 Ω
Minimum Leakage Resistance	15000 Ω maximum
Maximum Number of Extension Instruments per Line	1 for PT or SLT 2 by Parallel or eXtra Device Port connection of a PT and a
Ring Voltage	75 Vrms at 20 Hz/25 Hz depending on the Ringing Load
Trunk Loop Limit	1600 Ω maximum
Hookswitch Flash/Recall Timing Range	24 ms to 2032 ms
Door Opener Current Limit	24 V DC/30 V AC, 1 A maximum
Paging Terminal Impedance	600 Ω
MOH (Music on Hold) Terminal Impedance	10000 Ω

4.3. SYSTEM CAPACITY

4.3.1. Maximum CO Line and Extension Cards

The following number of CO Line and extension cards can be installed in the main unit (Hybrid IP-PBX) for expansion.

Card Type	KX-TDA100
CO Line Card *1	4
Extension Card	4
Total	5

***1 One T1 and PRI23 card counts as 2 cards.**

Note:

- **For each card, a maximum number that can be installed in the main unit is listed in "Installation Manual".**
- **Any card that exceeds the capacity of the main unit will be ignored.**
- **When the main unit starts up with an invalid configuration mode, some cards will be ignored.**

4.3.2. Maximum Terminal Equipment

The following number of terminal equipment can be supported by the main unit.

Terminal Equipment Type	KX-TDA100
Telephone *1	64
CS	16
PS	128
Voice Mail	2
Doorphone	8
Door Opener	8
Add-on Key Module + USB Module	64

***1 When only T7600 series DPTs and SLTs are connected. If other DPTs or APTs are connected, the maximum number will decrease as each of these units is counted as 4 sets of SLTs or DPTs (T7600 series).**

4.3.3. Power Supply Unit Selection

Main unit needs an optional power supply unit (PSU) suitable for its configuration. Calculate the amount of "load figures" from the type and number of equipment to be connected, and determine the type of PSU that will be required.

Load Figure Calculation

Equipment Type		Load Figure
PT	DPT (T7600 series)	1
	Other DPT/APT/DSS Console	4
Extension Card *1	DHLC8	8
	SLC8	8
	SLC16	16
	MSLC16	16
CS		4
ISDN Extension		2
Voice Mail		1

***1 Only the extension cards that can support SLTs count for the load figures.**

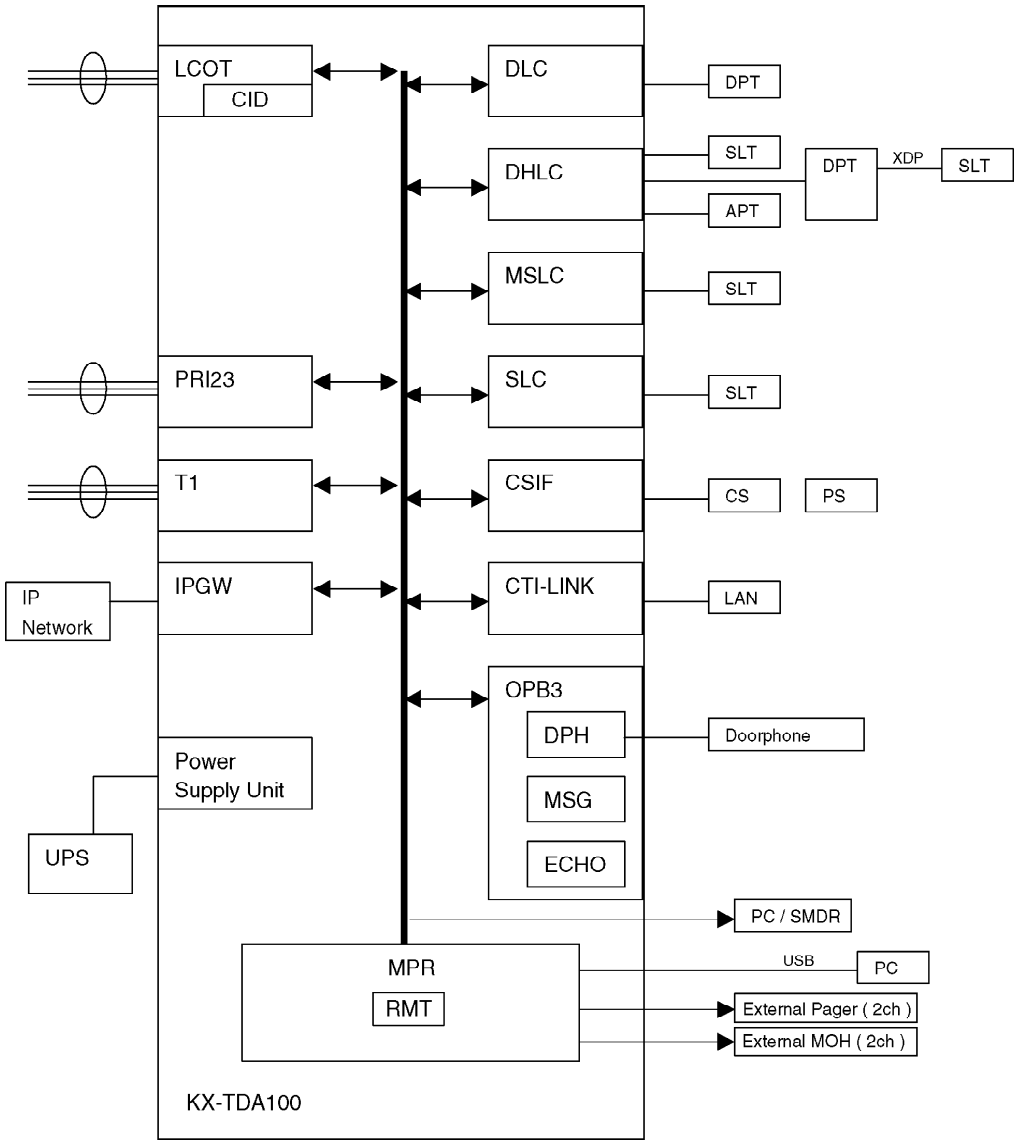
PSU Capability
Each PSU supports a different amount of load figures.

PSU Type	Maximum Load Figures
PSU-S	64
PSU-M *2	128

***2 Available for the KX-TDA100 and KX-TDA200.**

5. SYSTEM OVERVIEW

5.1. SYSTEM CONFIGURATIONS



5.2. SYSTEM COMPONENTS

	Model	Card Name	Description
Shelf	**KX-TDA100**		**Basic Shelf**
Main Central Processing Card		**MPR**	**Main Processing Card**
MPR Option Card	**KX-TDA0196**	**RMT**	**Remote Card**
Trunk Cards	**KX-TDA0180** **KX-TDA0181** **KX-TDA0187** **KX-TDA0193** **KX-TDA0290** **KX-TDA0480**	**LCOT8** **LCOT16** **T1** **CID8** **PRI23** **IP-GW4**	**8-Port Analogue Trunk Card** **16-Port Analogue Trunk Card** **T-1 Trunk Card** **8-Port Caller ID Card** **PRI Card** **4-Channel VoIP Gateway Card**
Extension Cards	**KX-TDA0144** **KX-TDA0170** **KX-TDA0171** **KX-TDA0172** **KX-TDA0173** **KX-TDA0174** **KX-TDA0175**	**CSIF8** **DHLC8** **DLC8** **DLC16** **SLC8** **SLC16** **MSLC16**	**8 Cell Station Interface Card** **8-Port Digital Hybrid Extension Card** **8-Port Digital Extension Card** **16-Port Digital Extension Card** **8-Port Single Line Telephone Extension Card** **16-Port Single Line Telephone Extension Card** **16-Port Single Line Telephone Extension with Messa Lamp Card**
Option Cards	**KX-TDA0161** **KX-TDA0166** **KX-TDA0190** **KX-TDA0191** **KX-TDA0410**	**DHP4** **ECHO16** **OPB3** **MSG4** **CTI-LINK**	**4-Port Doorphone Card** **16-Channel Echo Canceller Card** **Optional 3-Slot Base Card** **4-Channel Message Card** **CTI Link Card**
Power Supply Units (PSUs)	**KX-TDA0104** **KX-TDA0108**	**PSU-M** **PSU-S**	**M-Type Power Supply Unit** **S-Type Power Supply Unit**
Cell Stations (CS's)	**KX-TDA0142**		**3-Channel Cell Station Unit for 2.4 GHz Portable Stat**

	Model	Card Name	Description
Proprietary Equipment	KX-A258		Blank Slot Cover
	KX-T30865		Doorphone

Available Telephones
This main unit (Hybrid IP-PBX) supports all of the Panasonic KX-T7xxx and KX-TD7xxx series:

- **Digital/Analog proprietary telephones (e.g., KX-T7625, KX-T7630, KX-T7633, KX-T7636)**
- **Portable stations (e.g., KX-TD7690, KX-TD7680)**
- **DSS consoles (e.g., KX-T7640)**

This main unit (Hybrid IP-PBX) does not support the following telephones:

- **KX-T308xx series Proprietary Telephones and DSS consoles**
- **KX-T616xx series Proprietary Telephones and DSS consoles**
- **KX-T1232xx series Proprietary Telephones and DSS consoles**

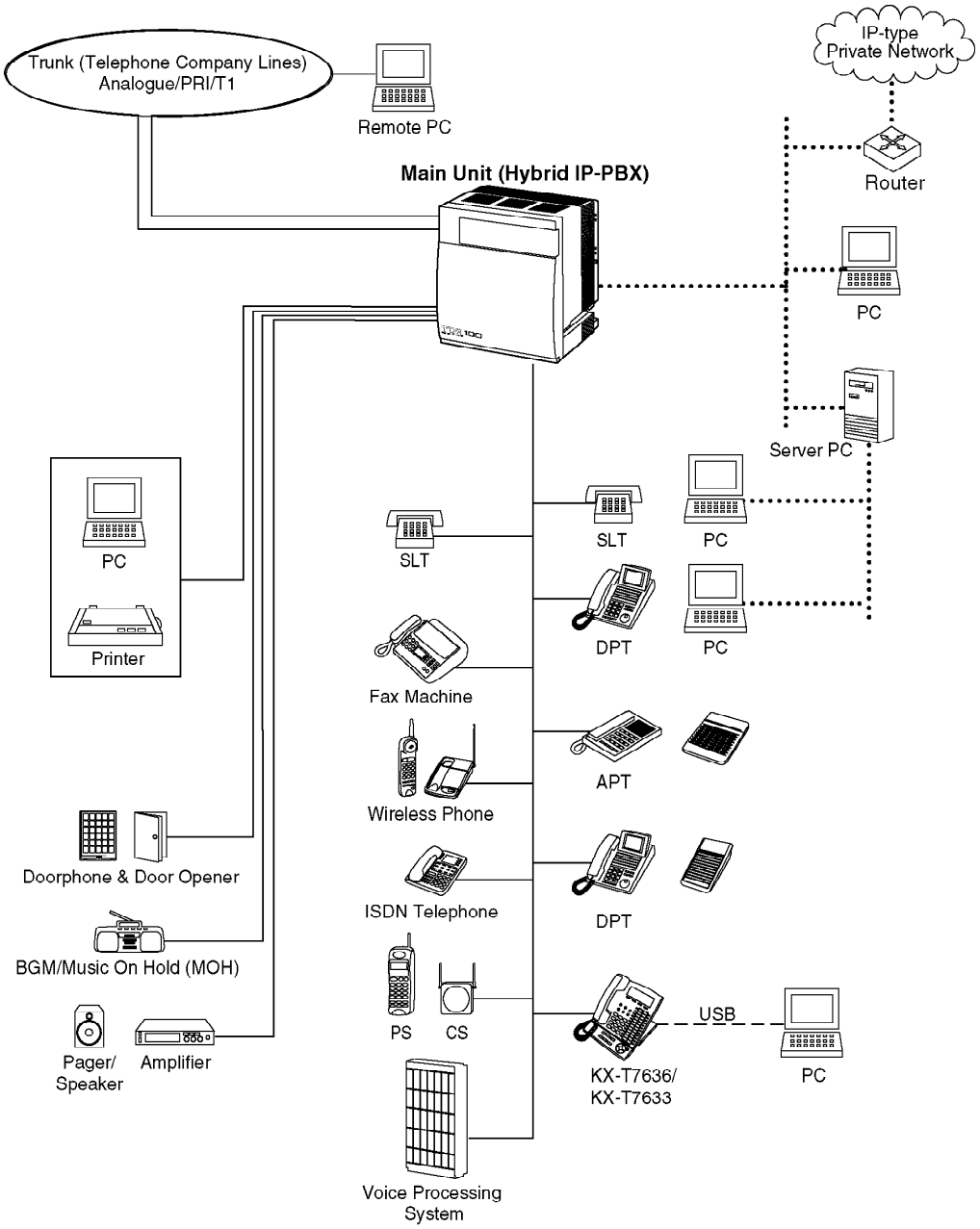
For the equipment (e.g., Add-on Key Module, USB Module, Headset) that can be connected to a particular telephone, refer to the telephone's manual.

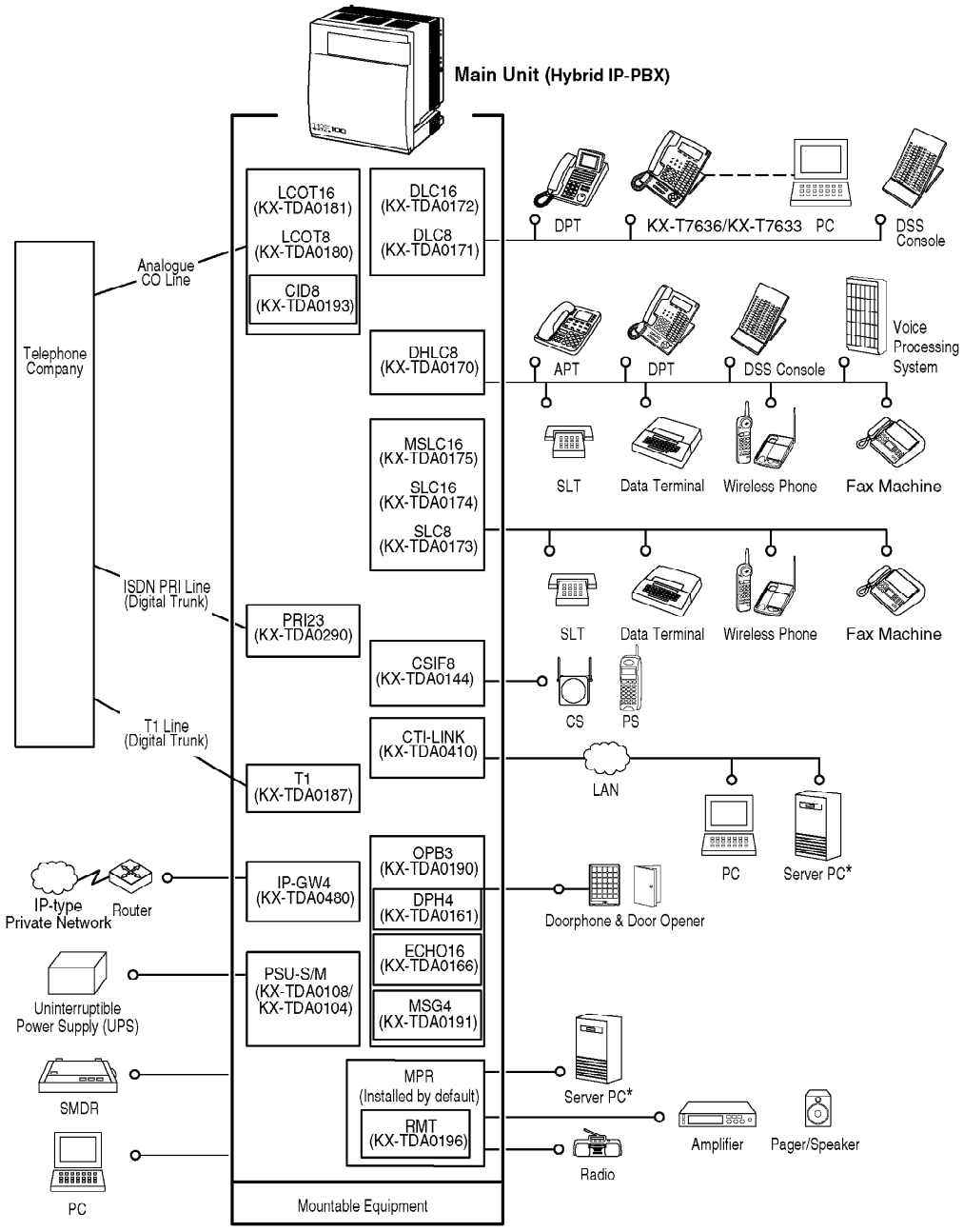
Abbreviations in this manual
Proprietary telephone: PT
Digital proprietary telephone: DPT
Analog proprietary telephone: APT
Portable station: PS
Single line telephone: SLT

Note:

- **There are some optional service cards and features that are not available for certain countries/areas. Consult your authorized Panasonic dealer for detailed instructions.**
- **The power supply capacity of this main unit (Hybrid IP-PBX) may differ from the values described in this manual depending on the model number. Please consult your dealer for detailed information.**

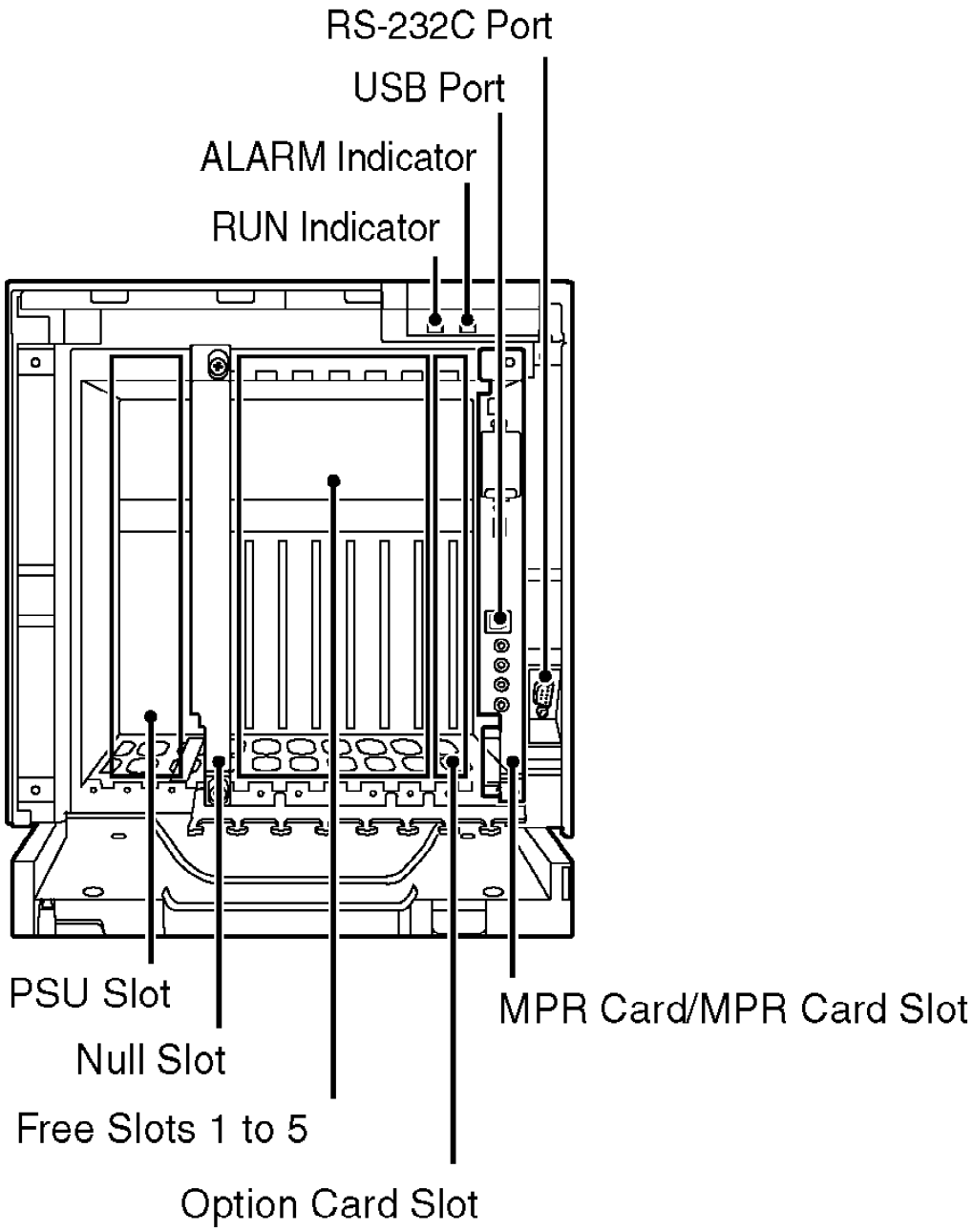
5.3. SYSTEM CONNECTION DIAGRAM


Trunk (Telephone Company Lines)
Analogue/PRI/T1
Remote PC
IP-type
Private Network
Router
Main Unit (Hybrid IP-PBX)
PC
Server PC
PC
Printer
SLT
SLT
PC
DPT
PC
Fax Machine
APT
Wireless Phone
Doorphone & Door Opener
ISDN Telephone
DPT
BGM/Music On Hold (MOH)
PS
CS
USB
Pager/
Speaker
Amplifier
KX-T7636/
KX-T7633
PC
Voice Processing
System



***Only 1 Server PC can be connected to the main unit (Hybrid IP-PBX). Two or more Server PCs cannot be used simultaneously.**

6. NAME AND LOCATIONS



- Null slot:

Null slot is not available for any optional service card.

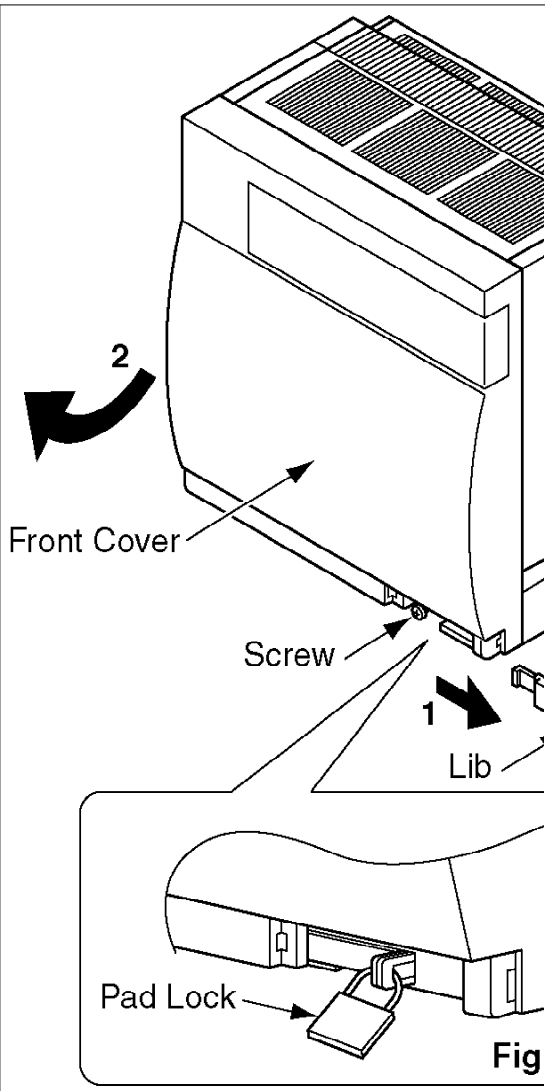
	LED Type	Color	Usage and Status Definition
RUN Indicator	LED1 (Power/RUN)	Green	Display of Power Supply & RUN Status OFF: Power OFF (inc. in normal resetting) ON: Power ON & RUN (On-Line) Flash (60/min.): Power ON & In starting Flash (120/min.): Power ON & In resetting before system clear
ALARM Indicator	LED2 (Alarm)	Red	Display of ALARM OFF: Normal ON: Alarm (CPU stop, Alarm for each card) Flash: Alarm (MPR file error in restarting)

Slot Type	MPR Card	CO Line Cards Extension Cards	OPB3 Card CTL-LINK Card
Free Slots 1 to 5	No	Yes	Yes
Option Card Slot	No	No	Yes
MPR Card Slot	Yes	No	No

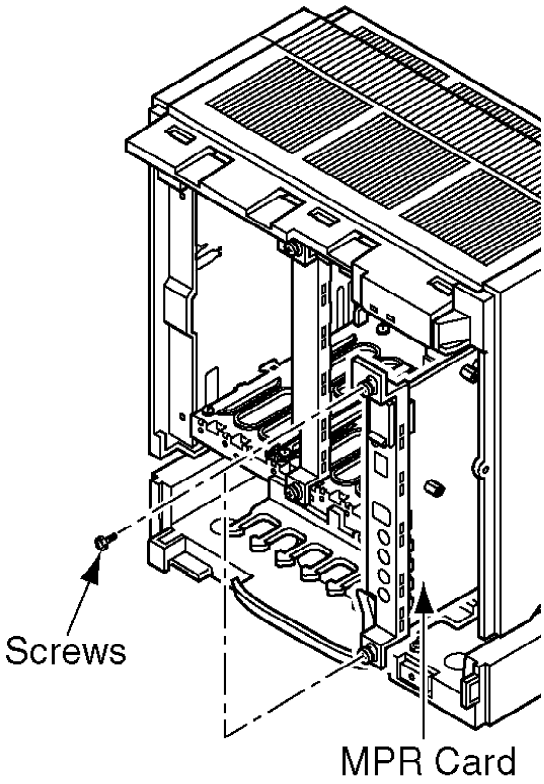
7. DISASSEMBLY INSTRUCTIONS

7.1. DISASSEMBLY INSTRUCTION (MPR CARD)

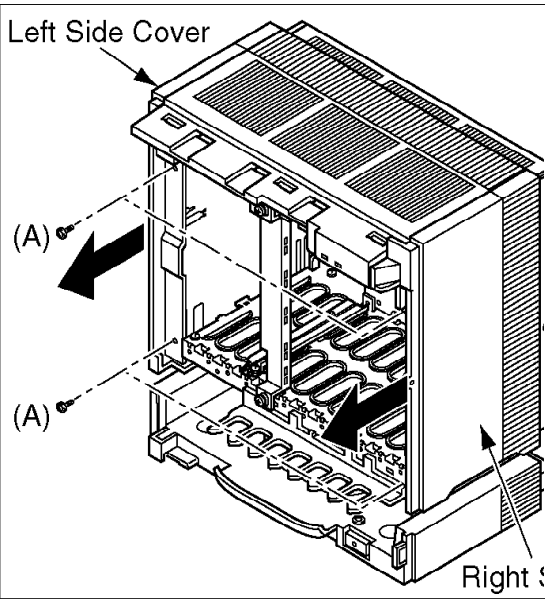
1. Remove the Lib by sliding it in the direction of arrow 1.
2. This will be removed if the user attached the Pad Lock as shown in a Fig.1.
3. Loosen the Screw.
4. Front Cover is removed in the direction of a arrow 2.

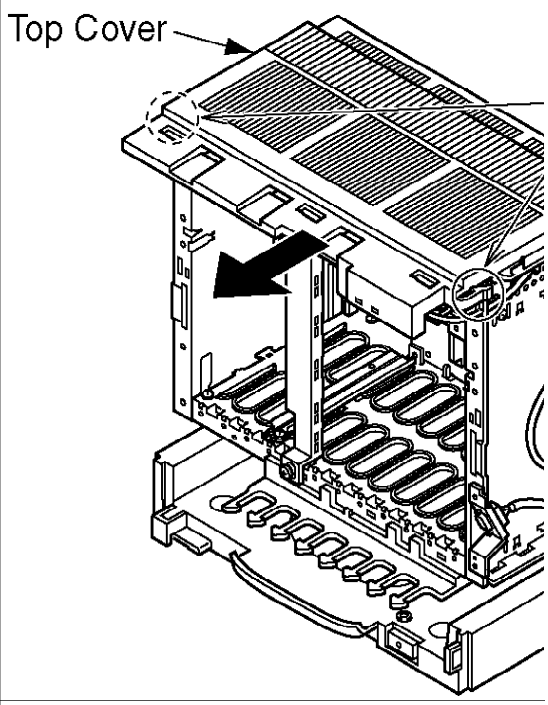
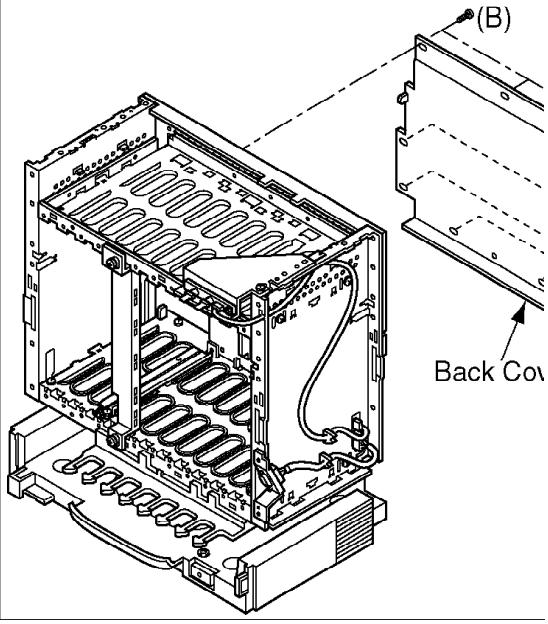


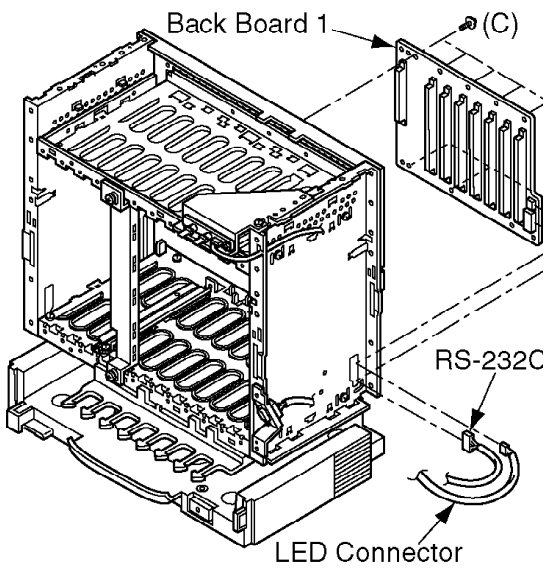
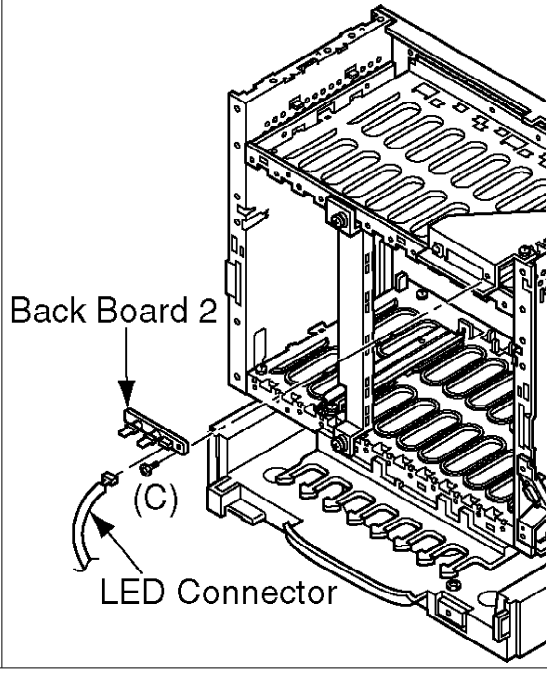
Fig

5. Loosen the two Screws. **6. Remove the MPR Card.**	

7.2. DISASSEMBLY INSTRUCTION (BACK BOARD)

1. Remove four Screws (A). **2. Remove the Left Side Cover and the Right Side Cover.**	

3. Remove the Hook. Remove the Top Cover.	
4. Remove nine Screws (B). **5. Remove the Back Cover.**	

6. Remove the RS-232C Connector and LED Connector from Back Board 1. **7. Remove eight Screws (C).** **8. Remove Back Board 1.**	
9. Remove the LED Connector from Back Board 2. **10. Remove the Screw (C).** **11. Remove Back Board 2.**	

8. OUTLINE

8.1. GENERAL DESCRIPTION

The control system of the main unit is composed of the main central processing card (MPR card) controlling the entire system and exchanging voice data, the circuit control section (LPR/ LC) controlling various telephone lines and the power supply section (POWER).
MPR card, LPR/LC and POWER are connected each other through the System BUS (ADDRESS BUS, DATA BUS and CONTROL BUS). MPR card and LPR/LC are under I/O control (I/O Read/ Write) by MPR card.
MPR card controls LPR which have a microprocessor by the Inter-Microprocessor Communication System supported by ASIC. Those are, MPR card and LPR exchange controlling messages through bi-directional buffer and CPU controls LPR so that it can manage multiple

telephone lines. Since LC does not have a microprocessor, it is completely controlled through ASIC from MPR card.
I/O address for LPR access is fixed for each free slot. CPU discriminates the sort of LPR through the inter-processor communication system.
POWER detects the voltage drop of the AC input and the DC output and transfers it to MPR card.

8.1.1. MPR Card

This card is the main control section of main unit. It controls all the cards mounted on the free slots, and communication of RS-232C ports.
There are two LED (BATT ALARM, SD ACCESS), one SD card slot, one push switch, one slide switch, one USB port, two MOH jacks, and two EPG jacks in the front of MPR card. BATT ALARM LED light red if the output of the lithium battery in MPR card is set to about 2.8v or less. During access to SD card, it green-blinks or SD ACCESS LED light and blink. Enclosed SD card is used for SD card slot on a main part, putting in. The main program is stored in SD card. It connects with PC and a USB port is used for a maintenance or a system setup. The external sound source for BGM or suspension sound is connected to a MOH jack. A speaker with amplifier is connected to external paging at an EPG jack. Light Emitting Diode (RUN indicator, ALARMindicator) arranged at the main part upper part is directly controlled from MPR card, and shows the state of a system of operation.
This control circuit executes the control signals for the exchange process, and this card is composed of the following
(A) 32bit CPU (32bit data bus)
(B) SDRAMs, SRAMs
(C) Flash memorys
(D) Lithium Battery for back-up of clock IC and Static RAMs

8.1.2. Back Board

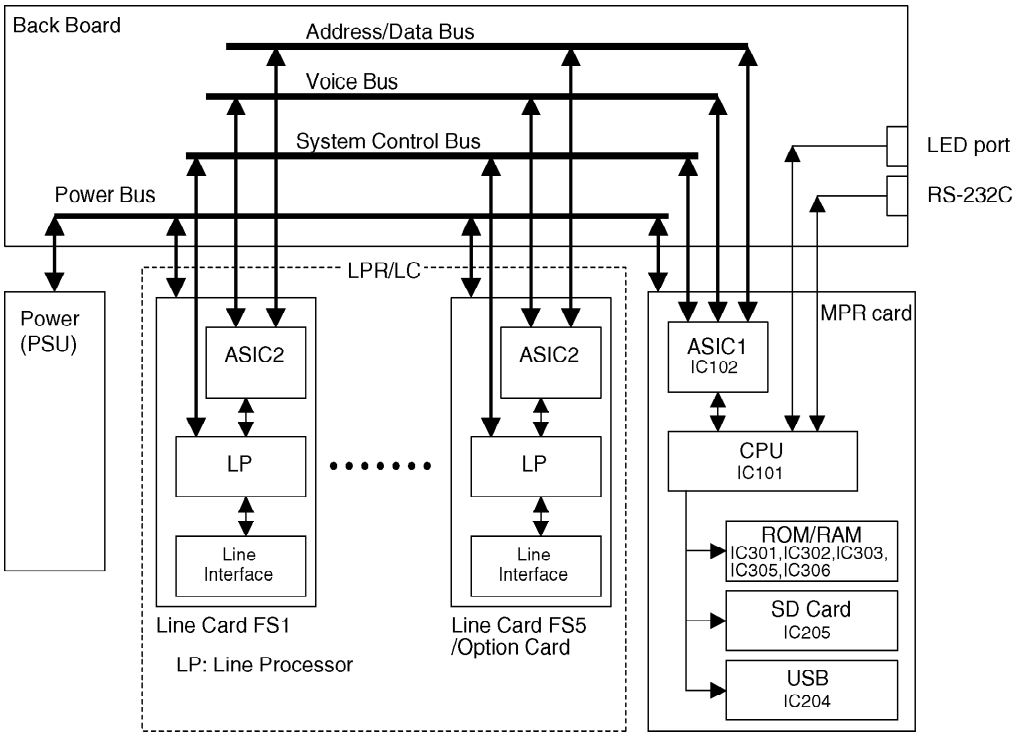
BB (back board) is the mother board of the basic shelf. This board connects each card/unit (POWER, MPR card, and optional service cards) together. This board has one RS-232C connector.

8.1.3. Power Supply Unit

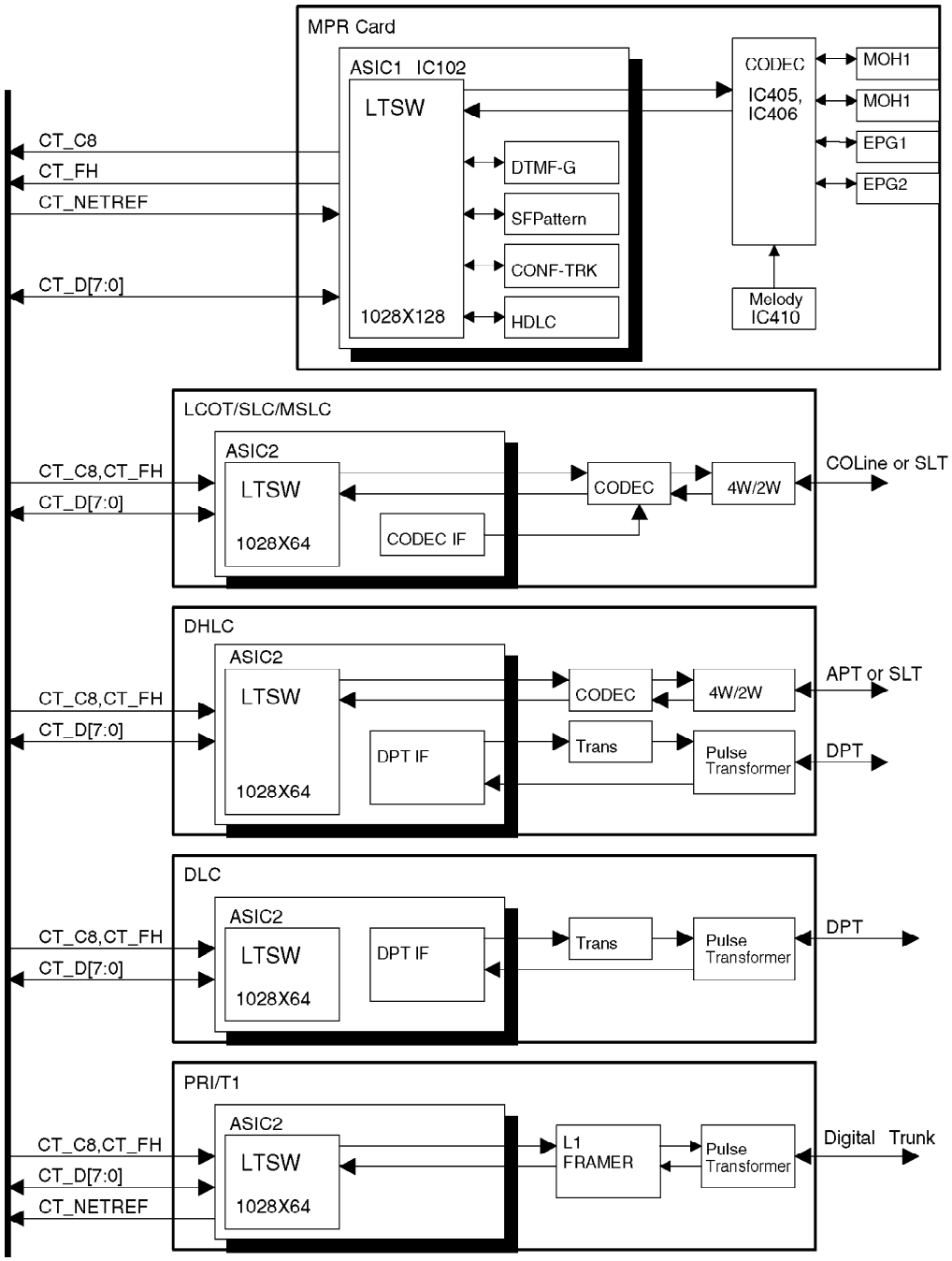
This unit is switching regulator power supply and supplies DC voltages to MPR card, and optional service card (free slot). PSU (power supply unit) has four outputs (40V, 30V, 15VPT, 15V). 15V output is supplied only in MPR card and option card. Other outputs are mainly used as an object for the electric supply to a terminal. Refer to each S/M for the details of PSU.

8.2. SYSTEM CONTROL

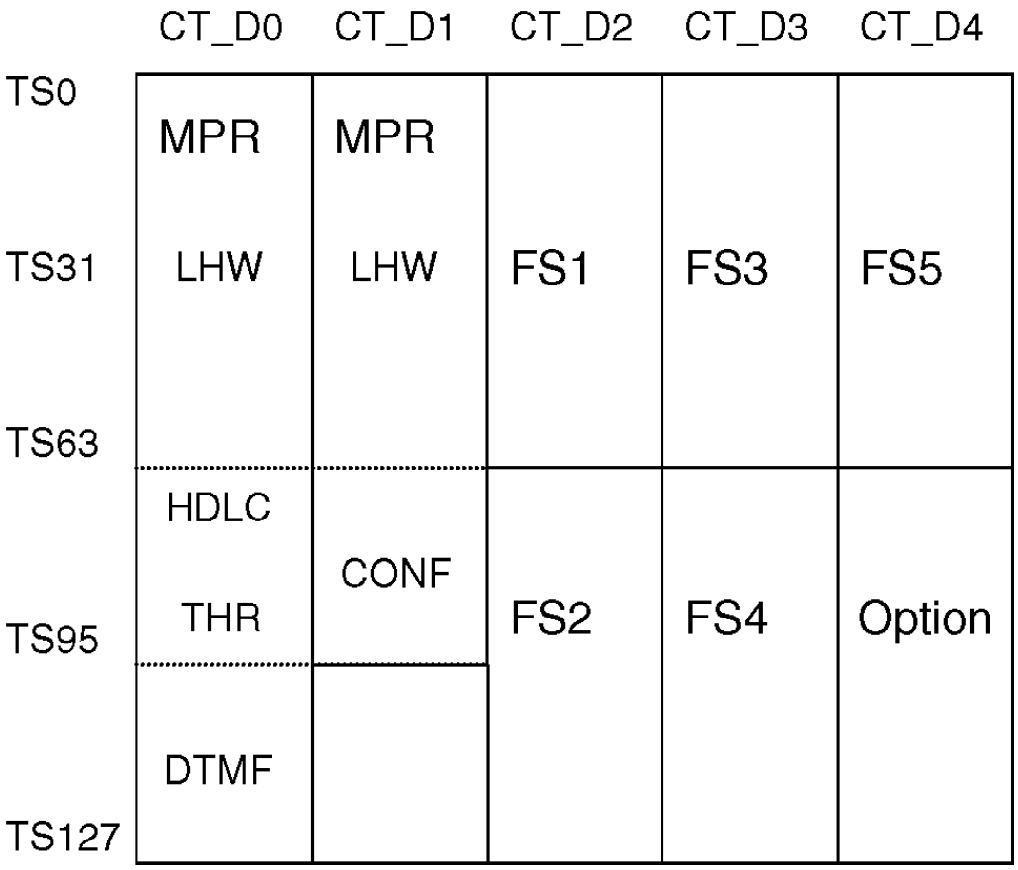
8.2.1. System Control Block Diagram



8.2.2. Voice (TDM Highway) Bus Block Diagram

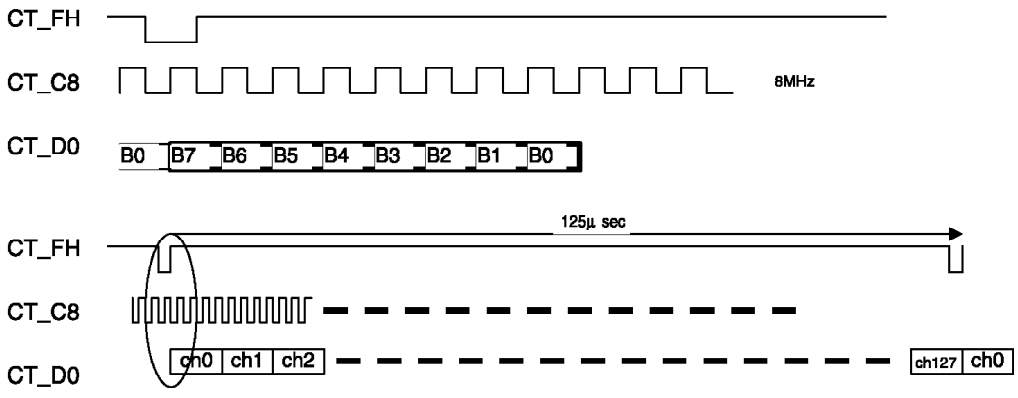


8.2.3. Voice Bus Logical Assignment



In the line card, the CT_D line number, which is output in accordance with the inserted slot, and the time slot are assigned by software.
For the detail of output slot for each card (optional service card), refer to the service manual of the card (optional service card).

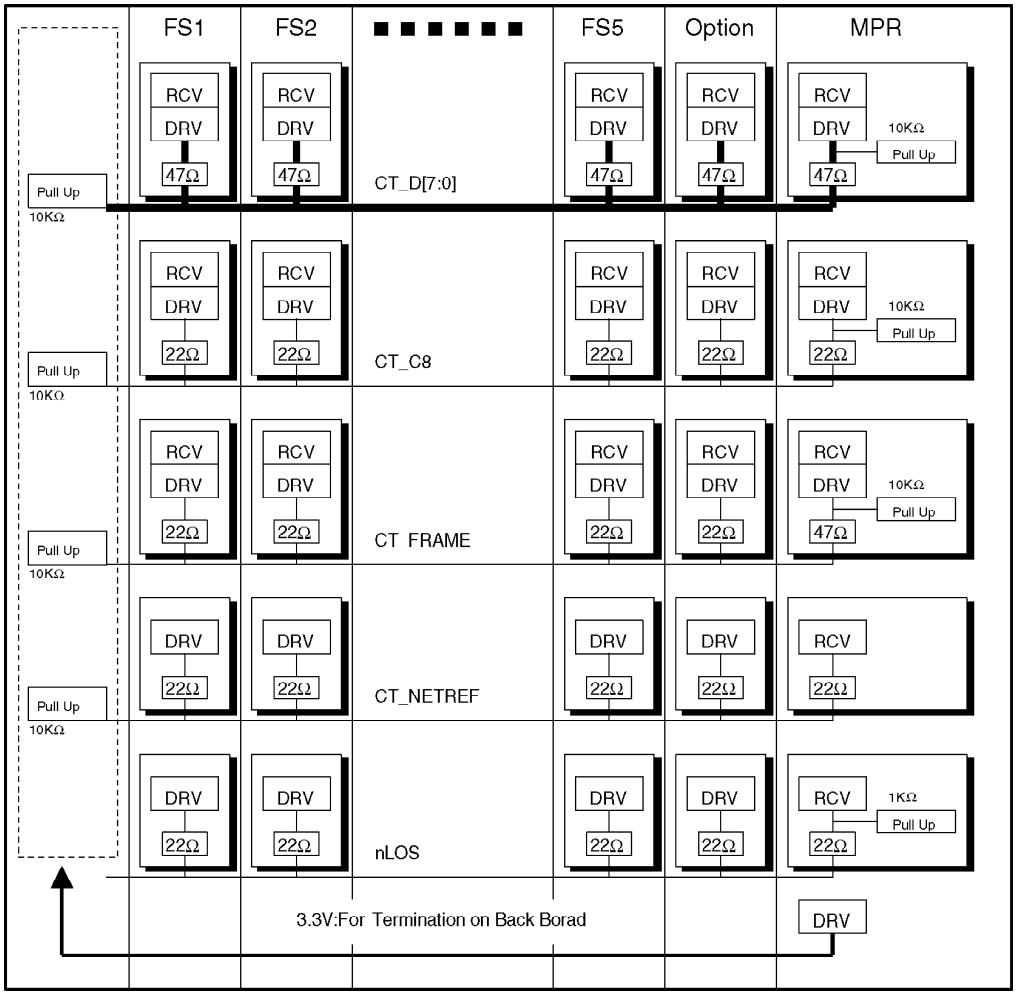
8.2.4. Back Board Signaling



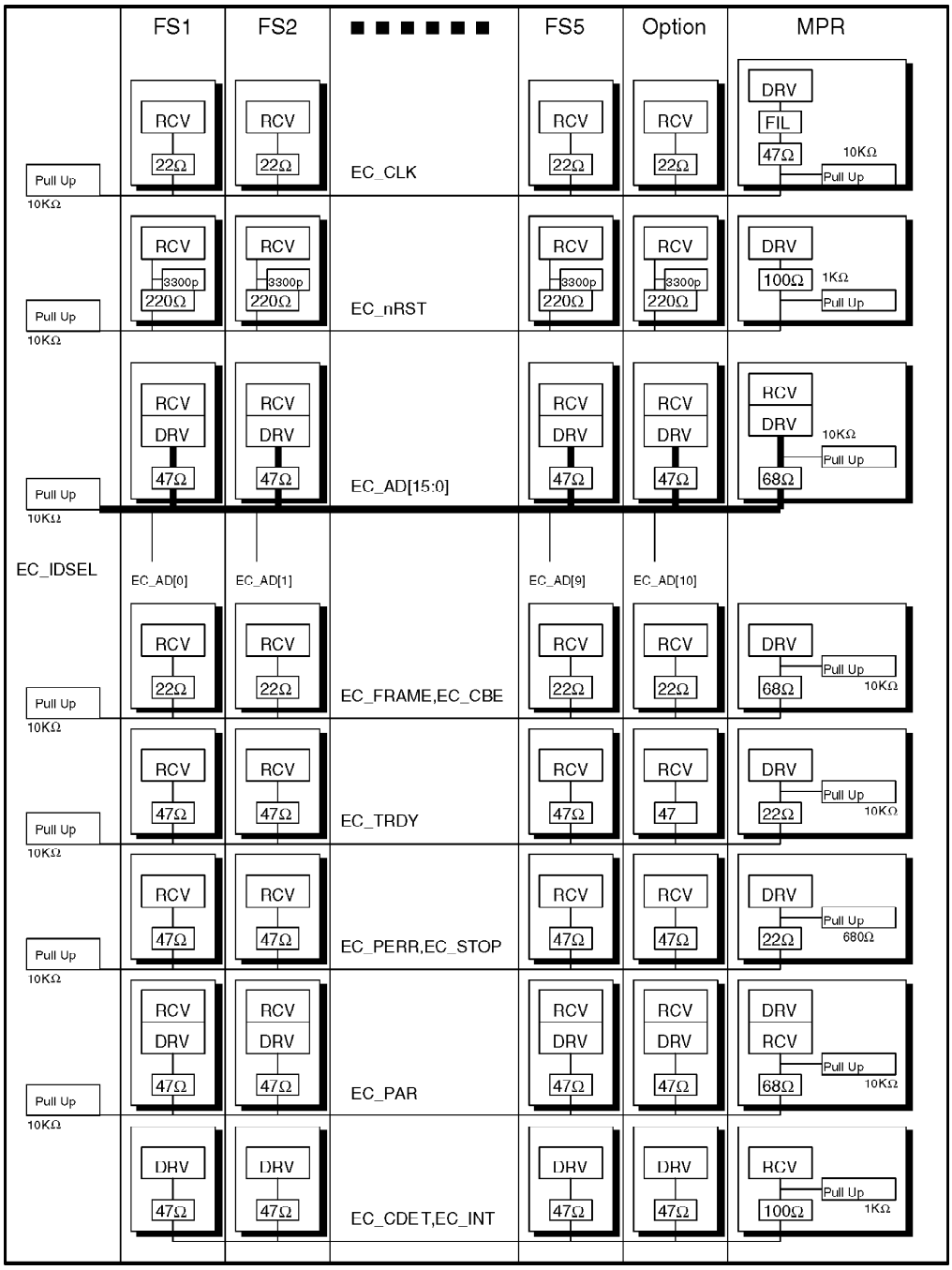
Back board waveform of TDM bus for voice

8.3. BACK BOARD SIGNAL CONNECTION DIAGRAM

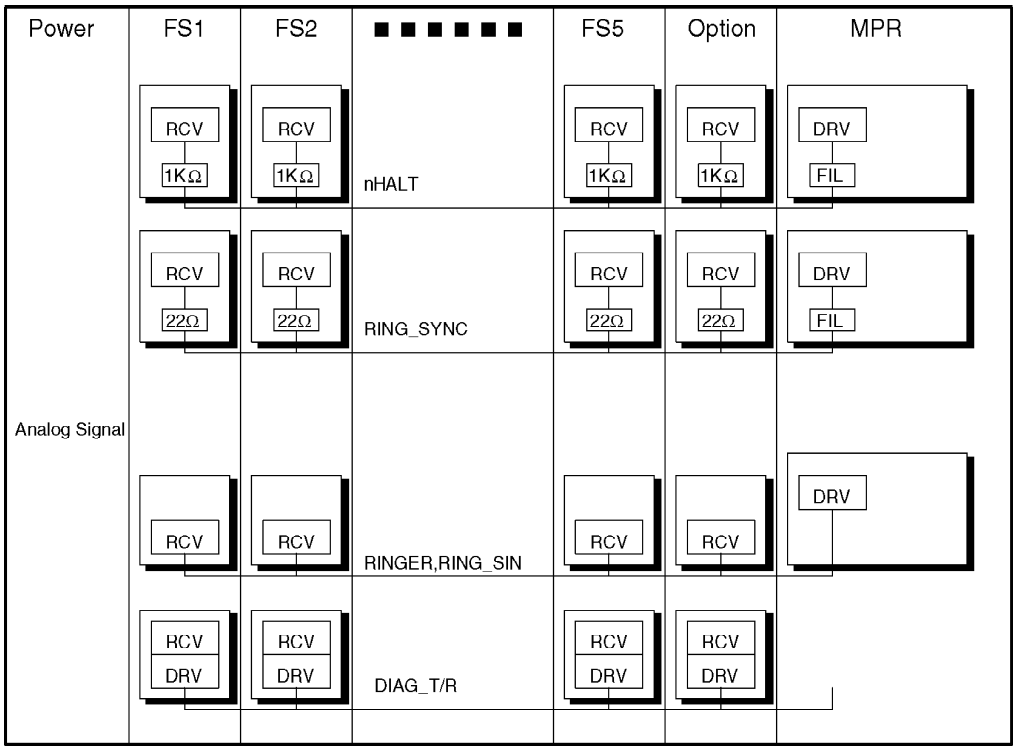
8.3.1. CT Bus System Connection Diagram



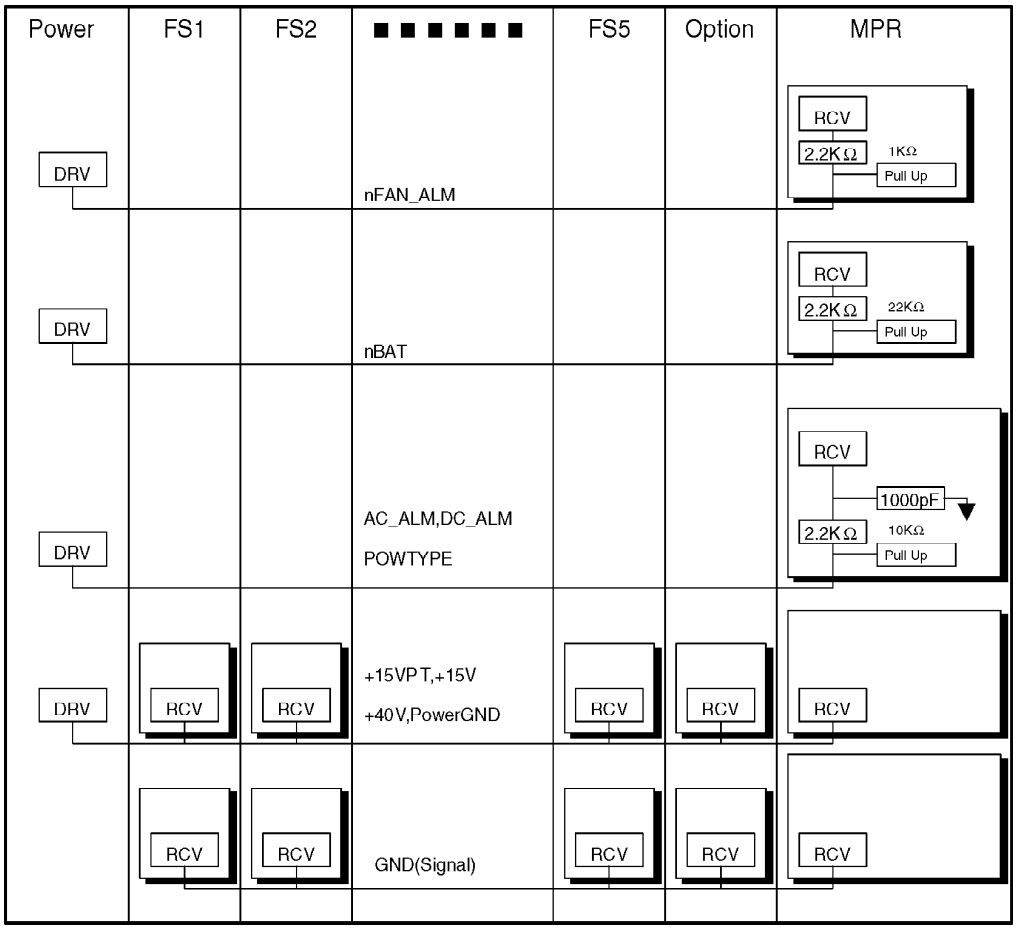
8.3.2. EC Bus System Connection Diagram



8.3.3. System Control and Analog Signal Connection Diagram



8.3.4. Power Supply System Connection Diagram



9. MPR CARD CIRCUIT OPERATION

9.1. MPR CARD

9.1.1. Outline

1) Function

- System Control
- Circuit Switching (includes gain adjustment function)
- Conference Call (3 people x 8 ~ 8 people x 3)
- MOH
- PAGING
- Clock

2) Configuration

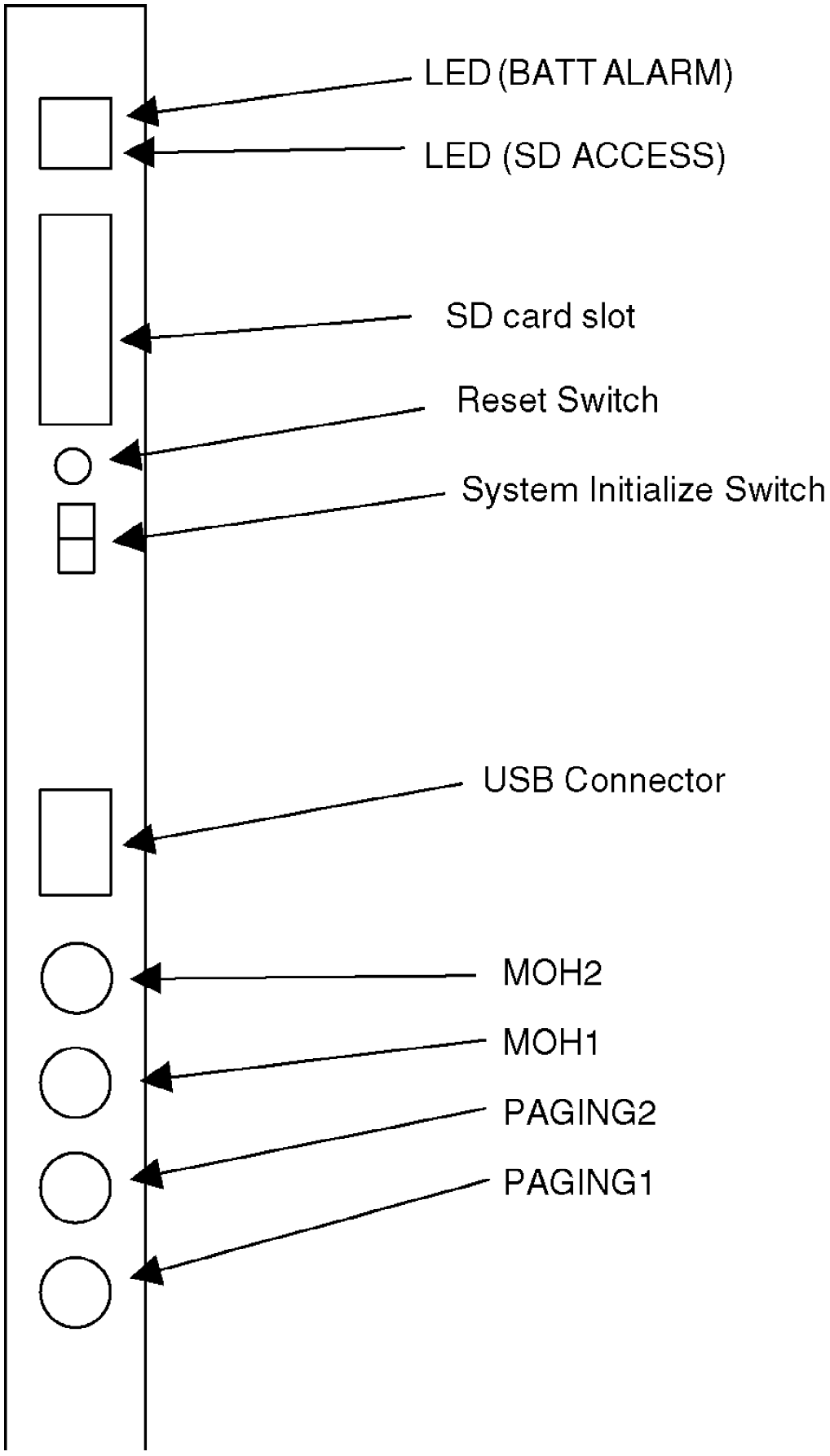
- Power Supply: DC/DC Converter
- CPU: HITACHI SH7709S (133MHz)
- ASIC: Our own products
- ROM: 4Mbit x 1 (for boot programs)
- SDRAM: 64Mbit x 2 (for work area)
- SRAM: 4Mbit x 2 (for user data backup)
- SD card I/F (for operating programs) x 1
- USB I/F (for PC programming) x 1
- MOH: External sound input x 2
- PAGING: External output x 2
- Expanded memory connector x 1
- Modem card connector x 1

3) Operation Rating

- Power Input : +15V
- Power Output : +15V (for MOH)
+3.3V (for I/O)
+3.3VBB (back board signal line pull-up)
+3.3VB (for SRAM backup)
+1.8V (for CPU core)
+1.9VB (for clocking backup)
±9.4V (for RS-232C driver/receiver)
+5VRMT unused (for remote card)

+5V (for RS-232C driver/receiver)

9.1.2. Description of Each Part


LED (BATT ALARM)
LED (SD ACCESS)
SD card slot
Reset Switch
System Initialize Switch
USB Connector
MOH2
MOH1
PAGING2
PAGING1

LED (BATALM): Lights when the lithium battery voltage drops below 2.8V.
LED (SD ACCES): Lights on when the SD card is being accessed.
SD card slot: Mounts the system program SD card.
Reset Switch: Press to reset the system.
System Initialize Switch:
On default startup, set the switch to the "SYSTEM INITIALIZE" position before turning the power ON. Return the switch to the "NORMAL" position when the main power switch starts to flash.
On normal startup, turn the power ON with this switch in the "NORMAL" position.
USB connector: B-type connector. Used for PC programming.
MOH 1, 2: External music on hold input.
PAGING 1, 2: External PAGING output. Connect to a device with a built-in amplifier.

9.1.3. Block Diagram

9.1.4. Circuit Description

9.1.4.1. Outline of Block Description

- CPU block
Operates the main unit control. Also operates various controls, generation of select signal, DMA control and serial port control. This contains the built-in clock function.
- ASIC block
Provides the communication between each optional service card, call control (TSW function), conference call, tone generation and gain control function.
- Memory block
This is a work area used for the main unit control program storage, the system boot program storage, or the user configuration data storage.
- USB block
Provides the USB I/F function. Connects to the PC to be used for PC programming or system data load/store.
- SD card block
Provides the SD card I/F function and loads the main unit program and the system data from the SD card containing the main unit control program.
- MOH/PAGING block
Provides the external music on hold input x 2, and the external paging output x 2 port. Also this provides the external music on hold input 1 system and exclusively the internal music on hold

output.

- Power block

Consists of DC/DC converter circuit and various regulators.

9.1.4.2. Detail of Block Description

- CPU block

Configuration: IC101 (CPU), IC107 (reset IC), IC103 (spread clock IC), X101 (CPU source clock), X102 (clocking clock) etc.

Function: (IC101)

Generates the select signal in accordance with the memory map and operates read/write of data between each peripheral.

Controls the DMA transfer between USB I/F or built-in serial controller and memory.

Operates input/output control of each I/O signal in accordance with the program.

Contains the built-in clock function (battery backup) with the source clock X102 (32.768 kHz).

(IC107)

Monitoring the power voltage, it generates a reset signal when the voltage drops under the constant value (2.9Vtyp) or when the reset switch is pressed down.

(IC103)

To reduce unnecessary radiation, it generates the clock with the constant blurring mainly X101 clock output (16.384 MHz).

Description of the Signal on MPR

Signal Name	Functions
+15VIN	+15V DC
+15V	For Circuit +15V DC MOH
+9.4V	For Driver IC +9.4V DC RS-232C
+5V	For Driver IC +5V DC RS-232C
+5VRMT	Reserve
3.3V_BB	+3.3V DC For pull-up of back board signal line
+3.3VB	+3.3V DC Battery backup For SRAM (IC301, IC302) backup
+3.3V	+3.3V DC
1.9VB	+1.9V DC Battery backup For clock function of CPU (IC100)
1.8V	For Core +1.8V DC CPU (IC100)
A[0]-A[25]	Address bus
nAC_ALM	AC alarm signal: Indicates AC voltage cutoff. (L: Alarm condition)
nBACK	Bus Acknowledge: Indicates Bus Acknowledge.
nBATT	Indicates whether external battery is connected or not. L: Connected
nBAT_ALM	Battery Alarm Signal: Indicates the declined voltage of lithium battery. (L: Alar condition)
nBREQ	Bus Request: Bus request signal
nBS	Bus Cycle Start: Bus cycle start signal
nCASL	Lower Byte Address Column Address Strobe: CAS signal for SDRAM
nCASU	Upper Byte Address Column Address Strobe: CAS signal for SDRAM
CH_SEL[0]	Synchronous Signal for CODEC (For MOH#1/Page#1)
CH_SEL[1]	Synchronous Signal for CODEC (For MOH#2/Page#2)
CH_SEL[2]	Synchronous Signal for CODEC (For RMT)
CKE	Clock Enable: CKE signal for SDRAM
CKIO	Clock I/O Terminal: For bus clock of SDRAM (IC305, IC306) and ASIC (IC101) C (IC100) outputs the clock of four times frequency as Source clock (16.384MHz)
nCS0	Chip Select 0: Chip select signal for flash memory
nCS2	Chip Select 2: Chip select signal for the expanded SDRAM (Future Option, Res present.)
nCS3	Chip Select 3: Chip select signal for SDRAM
nCS4	Chip Select 4: Chip select signal for SRAM
nCS5	Chip Select 5: Chip select signal for ASIC
nCS6	Chip Select 6: Chip select signal for USB I/F and SD card I/F
nCS_FLASH0	Chip Select for Flash memory 0: CS signal for IC303
nCS_FLASH1	Chip Select for Flash memory 1: CS signal for IC304 (reserve)
nCS_SDB0	Chip Select for Sd card I/F
nCS_SDB1	Reserve
nCS_SRAM0	Chip Select for SRAM 0: CS signal for IC301

Signal Name	Functions
nCS_SRAM1	Chip Select for SRAM 1: CS signal for IC302
nCS_USB	Chip Select for USB I/F
nCTS2	Clear To Send from RS-232C connector
CTS_RMT	Clear to Send: Flow signal for modem
CT_C8	Clock 8.192MHz clock outputted from PLL master
CT_D[0] -[7]	CT Data Bus: Two-way serial data bus to which the drive from any card is poss system.
CT_FRAME	Frame Signal: 8KHz frame signal outputted from the master
CT_NETREF	Backup Synchronous Signal (MAX 2MHz) 8KHz signal output from slave etc.
C_CS[0]	Chip Select For RMT
D[0] -D[31]	Data Bus
nDACK0-1	DMA Acknowledge: For USB I/F
DCD2	Data Carrier Detect
DCLK_RMT	Codec Clock (8MHz): For RMT
nDC_ALM	DC ALARM:DC alarm signal; Indicates the declined DC voltage. (L: Alarm conc
DIN_RMT	Codec Data Input: For RMT
DOUT_RMT	Codec Data Output: For RMT
DQMLL (nWE0) DQMLU (nWE1) DQMUL (nWE2) DQMUU (nWE3)	Data Input/Output Mask (Write Enable): DQM signal for SDRAM and WE signal memory IC and ASIC
nDREQ0-1	DMA Request: For USB I/F
DSR2	Data Set Ready from RS-232C connector
DSR_RMT	Data Set Ready from RS-232C connector
DTR2	Data Terminal Ready to RS-232C connector
EC_AD[0] -[15]	Address of EC Synchronous Bus, Data Bus (4MHz)
EC_nCBE[1]-[0]	EC Bus Command/Byte Enable: The initiator drives as bus command in the ad phase and as byte enable in the data phase.
EC_nCDET	EC Line Card Detection Signal Asynchronous interrupting signal
EC_CLK	Clock of EC Synchronous Bus (8MHz) All EC bus signals except nRESET/EC_I operates in sync with this signal.
EC_nFRAME	EC Cycle Frame Signal: Indicates the drive by initiator and the execution of EC cycle.
EC_nINT	EC Interrupting Signal: Be asserted when slave interrupt occurs.
EC_PAR	Parity Bit of EC Synchronous Bus: Drive by applying even parity to AD[15:0] a 0]. (4MHz)
EC_nPERR	EC Parity Error: Flag indicating error status by parity flag
EC_nRST	EC Reset Input: System reset input signal
EC_nSTOP	EC Bus Stop Signal: Be asserted when target requests transaction halt to initi
EC_nTRDY	EC Target Ready Signal: Indicates the drive by target and the possible data tra
nFAN_ALM	Fan Alarm: It goes Low at the error of the L Power Supply's FAN. It goes High FAN is normal and, Power Supply S and M, which does not carry the FAN, are

Signal Name	Functions
FSEL0	Signal which switches the Flash Memory address of the MEX card. FSEL0 is s jumper. L: The number of Flash Memory chips on the MPR is 1pc. H: The numb
GAIN0-1	Gain: Gain adjustment signal for the RMT card (Reserve)
HALT	Alerts the occurrence of the declined DC voltage to line card. H: Active L: Norr
nINIT	System Initialization Switch Input: L: At system initialization, H: At normal star
nIRQ_ASIC	Interrupt Request from ASIC: Indicates ASIC requests interrupt.
nIRQ_SDB	Interrupt Request from SD card I/F: Indicates SD card I/F requests interrupt.
nIRQ_USB	Interrupt Request from USB I/F: Indicates USB I/F requests interrupt.
LA[1] -[16]	Address bus
nLB	Lower Byte Select: Indicates Lower byte select signal of SRAM
LD[0] -[15]	Data Bus
LDHW[1] -[0]	Down Highway: Data output terminal connected to codec etc. as down data sig local highway
nLEDALM	Alarm display L: On
nLEDRUN	RUN display L: On
nLOS	Loss of synchronous signal: Reserve at present
LHWCLK[0]	Highway Clock Signal (8MHz): Bit clock of local highway and selectable among 4.096 / 8.192MHz.
LUHW[1] -[0]	Up Highway: Data input terminal connected to codec etc. as up data signal of l highway.
MASTER/nS	Master/slave identification signal when SIC card (Future Option) as intersyster connection card is mounted. MPR inputs this signal and detects which the MP H: Master L: Slave
MD0-2	Mode Control Terminal: Clock operation mode of CPU is set.MD2: L, MD1: L, M Fixed
MELODYSEL	Melody IC Tune Name Select L: Ju te veux H: Minuet
MEX_MODE[0] -[3]	Information Bit to know the memory mounting capacity etc. of MEX card. Rese present.
MOHSEL	Switching Signal between internal hold sound source and external hold sound Internal L: External
Mu/nA	Switching Signal of Sound Compression Law H: Mu-Law, L: A-Law
M/nS	TDA100, TDA200 Identification Signal set on the back board. The MPR inputs t and detects which the MPR will be. H: TDA200, L: TDA100

Signal Name	Functions
POWTYPE[0] -[1]	Power Supply Type : POWTYP [1] S Power Supply attached H M Power Supply attached L L Power Supply attached H
nPRS_MEX	Press MEX: Information of MEX Card Attachment L: Attached, H: Not attached
nPRS_RMT	Press RMT: Information of RMT Card Attachment L: Attached, H: Not attached
nPRS_SDB	Press SD card: Information of SD Card Attachment L: Attached, H: Not attache
nRAS3L	Lower Byte Address Row Address Strobe: RAS signal for SDRAM
nRAS3U	Upper Byte Address Row Address Strobe: RAS signal for SDRAM
nRD	Read: USB I/F, SD card I/F, ASIC, SRAM, Read signal for flash memory
RD/nWR	Read/nWrite: Read/Write signal for SDRAM
nRESOUT	Reset Out: Reset from CPU (IC101) to each card
nRESET	Reset: Power-on reset signal
nRESETM	Manual Reset: Manual reset request signal for CPU
RINGER	Ringer Signal: Outputs square-wave of 16Hz/20Hz/25Hz as source signal of rin
RING_SYNC	Trigger Signal of Ringer Signal generation timing to each internal line card
nRTS2	Request To Send to RS-232C connector
RTS_RMT	Request to Send: Flow signal for modem
RXD2	Receive Data from RS-232C connector
RXD_RMT	Serial Data Output Terminal: ASIC
SDCD	SD Card Detect Input
SDCLK	SD Card Clock Out
SDCMD	SD Command
SDDAT0-3	SD Card Data
SDWP	SD Card Write Protect Input
SHW_CLK	Intersystem Highway Clock Signal (4MHz) Bit clock of intersystem highway an selectable between 256KHz/512KHz/1.024MHz/2.048MHz/4.096MHz.
SHW_FH	Intersystem Highway Synchronous Signal (8KHz) 8KHz frame synchronous sig intersystem highway
TXD2	Transmit Data to RS-232C connector
TXD_RMT	Serial Data Input Terminal: Data receiving terminal from RMT to UART in the A
nUB	Upper Byte Select: SRAM
USB_D+	USB Data +

Signal Name	Functions
USB_D-	USB Data -
VBUS	Bit indicating power source is supplied to USB bus [Host (PC etc.) is connecte Host connected L: Host not connected
VREF	Reference Voltage for MOH Circuit Intermediate potential of +15V
nWAIT	Wait: Hardware wait request signal for bus timing between CPU and ASIC
WDTCLR	Reserve
nWE	Write Enable: WE signal of SRAM

- ASIC block

Configuration: IC102 (ASIC), IC111, X103 and so on.

Function: (IC102)

Functions as the bus master of EC bus (synchronous bus with 16 bit width, transmission rate max.10Mbps). Communicates with ASIC mounted to each option card via EC bus and controls the option card.

Controls CT bus (HW clock 8.192MHz, 8 highway, 128 timeslot) for TSW function.

(A detailed description of TSW will be added later.)

Controls the conference call for 3 people x ~8 parties ~ 8 people x ~3 parties.

Generates single and DTMF tone in any highway and timeslot.

Provides the digital gain control function by data conversion.

Provides some I/O ports for CODEC channel pulse generation, modem encoding rule setting and music on hold switching and is controlled by CPU.

- Memory block

Configuration: IC301, IC302 (SRAM), IC303 (FlashROM), IC305, IC306 (SDRAM), IC309, IC310, IC311 (logic IC) and so on.

Function: (IC301, IC302)

Saves the user configuration data (such as key assign data per PT).

This memory is battery backup.

(IC303)

Saves (some of) the system boot program and the system data.

(IC305, IC306)

The main program is loaded from the SD card on the system start-up.
Used as the program area and the CPU work area after start-up.
Makes a direct bus connection to CPU due to high-speed action (bus clock 66MHz).
(IC309, IC310, IC311)
Generates each memory select signal from the memory area select signal and upper address. Generates the write signal and upper/lower byte select signal.

- USB block

Configuration: IC204 (USB I/F), X201 (source clock: 12.000MHz), CN209 (USB connector) etc.
Function: Connects to the USB host system (mainly PC) via CN209 (B type connector) as a USB device and makes data transfer by max.11Mbps. DMA function of CPU is utilized to transfer the data.

- SD card block

Configuration: IC205 (SD card I/F), IC209, X202(20MHz), CN211 (SD card connector) and so on.
Function: Loads the main program and the system data from the SD card connected to CN211 by 10Mbps. Restores the system data periodically.

- MOH/PAGING block

Configuration: IC405, IC406 (CODEC), IC408, IC409 (OP Amp), IC410 (Melody IC), Q407~Q410 (transistor), JK401~JK404 (pin jack) etc.
Function: The external music on hold 1 is input from JK404 and is A/D converted in IC405 via AGC (Auto Gain Control) circuit, which consists of IC408, Q407, Q409 and other CR, and then is connected to the call line HW. Likewise the external music on hold 2 is input from JK403 and is made A/D conversion in IC406 via AGC (Auto Gain Control) circuit, which consists of IC409, Q408, Q410 and other CR, and then is connected to the call line HW. The external music on hold 2 and IC410 is exclusively connected to IC406 input (by software control).
The various tones & DTMF tone and the voice data generated in IC102 (ASIC) are made D/A conversion in IC405 and IC406. They

are output via JK402, JK401 respectively.

- Power Supply block

Configuration: IC402 (DC/DC converter), IC403 (1.8V regulator), IC404 (1.9V regulator), IC411 (OP Amp), IC413 (negative power regulator), Q403, Q404, Q405, Q411, Q412 (transistor), L401, C408, C453, C454, D406~D409, BAT401, IP401, IP402 (circuit protection device) and so on.

Function:

+15V input is made step-down to +3.3V by DC/DC converter circuit that consists of IC402, L401, Q412 and C408, and is supplied to each IC power. Also, it monitors +3.3V output voltage and turns ON Q411 to block +15V input when over voltage is supplied.

+15V input is dropped to +9.4V by Q403 and is supplied to RS232C driver with the inverted voltage (about 9.1V) generated in IC413, C453 and C454.

+3.3V generated in DC/DC converter is converted to 1.8V in the back board or IC403 and Q405 via Q404 and supplied to IC101 core power, and also is converted to 1.9V in IC404 via the back-flow prevention diode D407 and supplied to IC101 clock block power.

BAT401, which is a lithium battery for memory backup, is connected to the power supply of IC301, IC302 (SRAM) via D408, D409.

IC411 compares BAT401 output voltage to the reference voltage (about 2.8V) and drives LED (BATALM) that indicates dropping of backup voltage.

IP401 and IP402 block the line respectively when over current flows to +15V and +3.3V line.

10. BACK BOARD CIRCUIT OPERATION

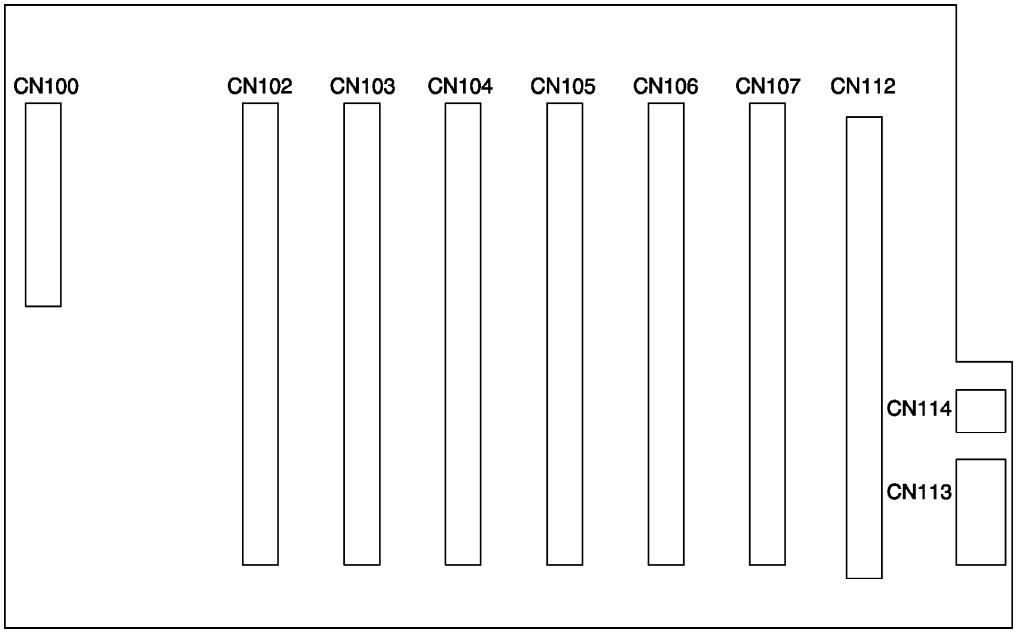
The back board (BB) connects signals between all cards in main unit. It also supplies power from the power supply unit (PSU) to the cards.

CONNECTORS EXPLANATION

(1) Power Supply Unit Connector: CN100

(2) Free Slot Connectors: CN102-CN106

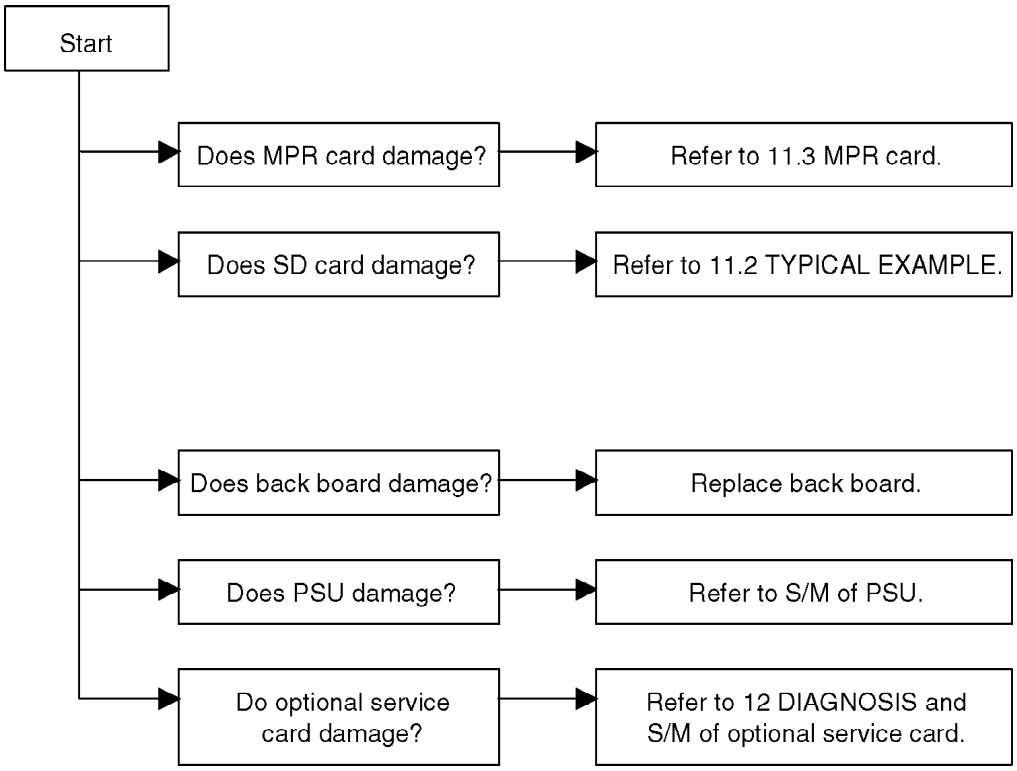
(3) Option Card Slot Connector: CN107
(4) MPR Card Connector: CN112
(5) RS-232C Connector: CN113
CN113 is connected to D-Sub connector in front of the product.
(6) LED Connector: CN114
CN114 is connected to LED Board on the product.



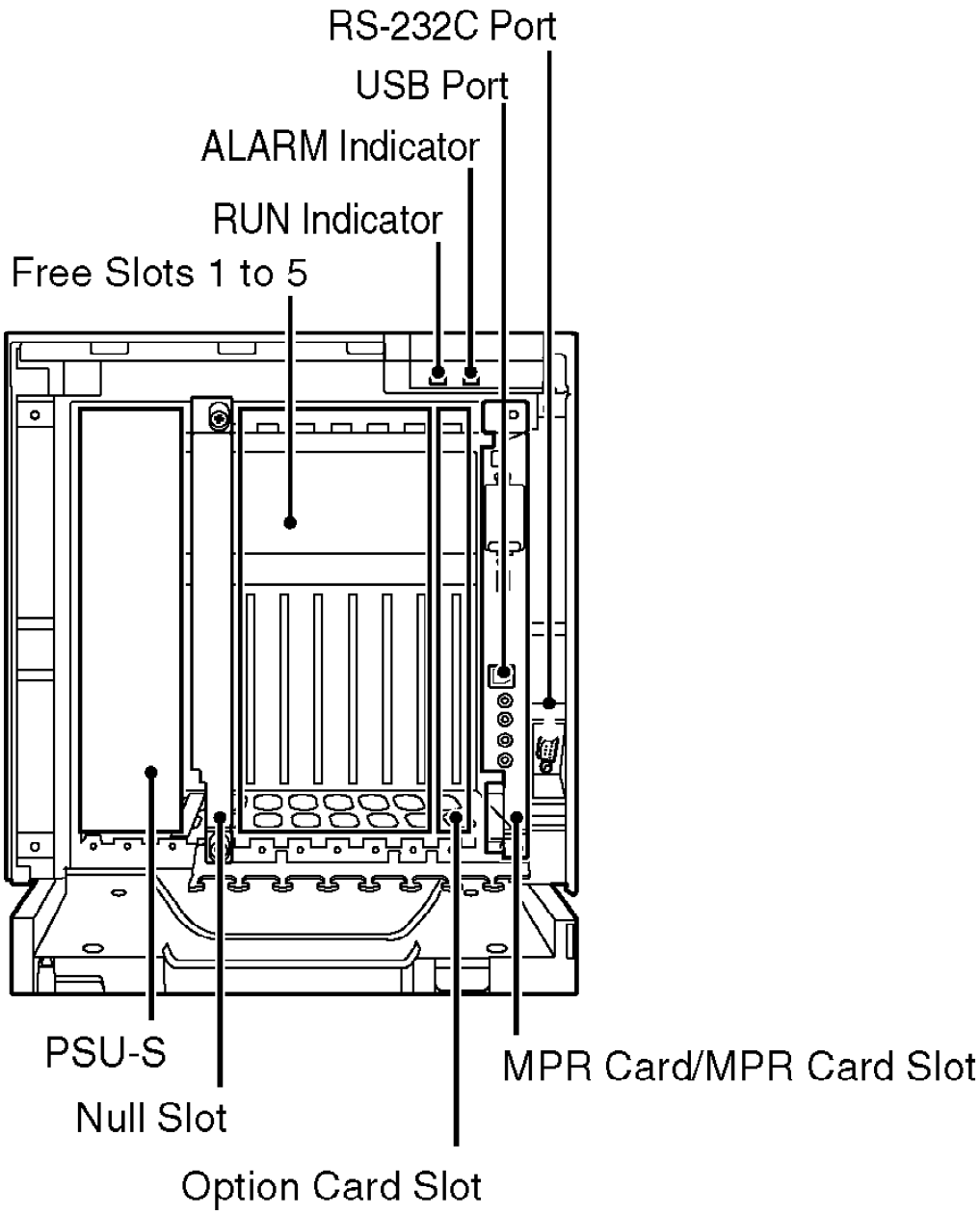
11. TROUBLESHOOTING GUIDE

11.1. INTRUDUCTION

First, check which part of the system is causing the trouble. Follow the flowchart provided below, and replace each unit in turn with a working unit to identify the damaged unit.



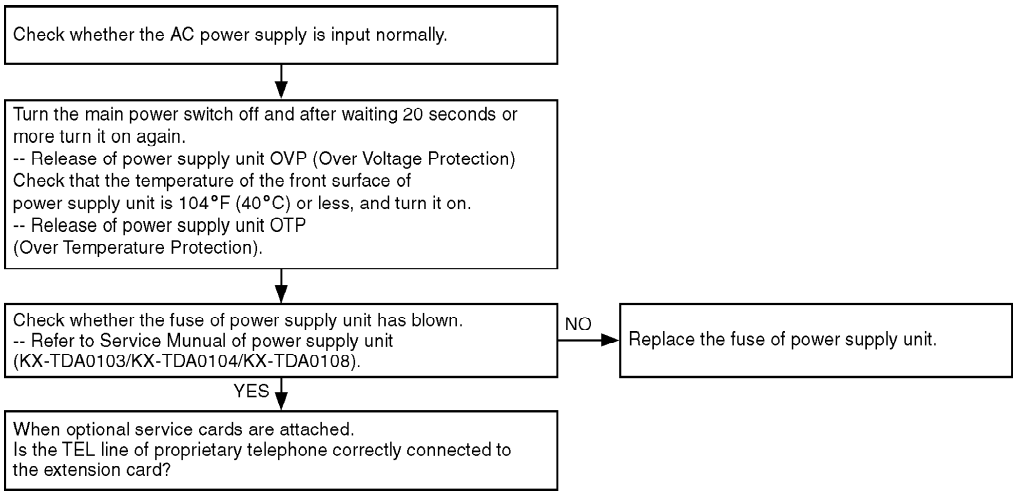
Even when damaged unit is found out, it may mean that not the cause in the unit but the damaged cause in another unit.



11.2. TYPICAL EXAMPLE

The following are typical examples of defects in the main unit.
When the following symptoms occur, first carry out the analysis described here, then repair the defective location.

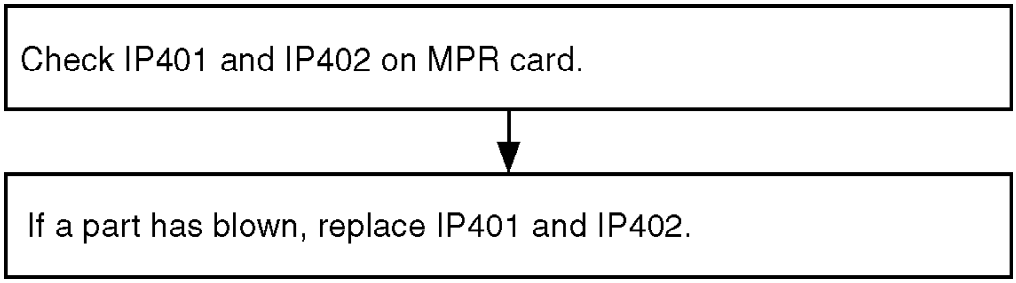
1. Even if the main power switch is turned on, none of the LEDs (Power indicator, RUN-ALARM indicator, BATT ALARM, SD ACCESS and other optional service cards LEDs) light up.



Note:

This may be a main unit defect. However it may also indicate that the main unit has detected an external temperature abnormality or an excessive voltage input from outside, and has operated the protection circuit. Symptoms that start the protection circuit are caused externally, so eliminate these causes before investigating the main unit.

2. When the main power switch is turned on, only the power indicator of power supply unit lights up. The LEDs of the main unit and MPR card (RUN-ALARM indicator, BATT ALARM and SD ACCESS) do not light up at all.



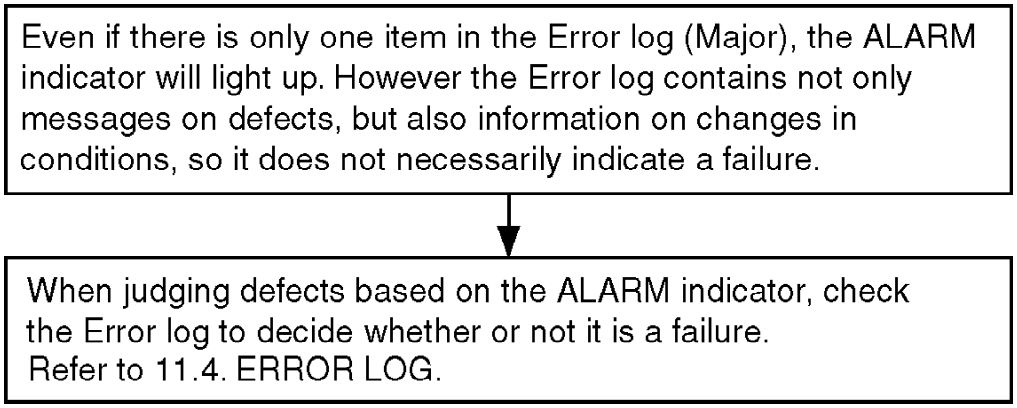
3. Trouble related to SD card.

Symptom	Checkpoint
• After turning on the power supply, the SD card is not accessed. • The SD card is accessed but the system start-up does not complete. • The system settings are initialized.	• Is the SD card properly inserted in the connector? • Has the write-protection of the SD card been locked? • Is an SD card other than the enclosed one being used? -->Depending on the format, it may not operate on the main unit. • Is the SD card broken?

Note:

We recommend that you keep a backup for the system settings on your PC, in case the settings are initialized by a mistaken operation.

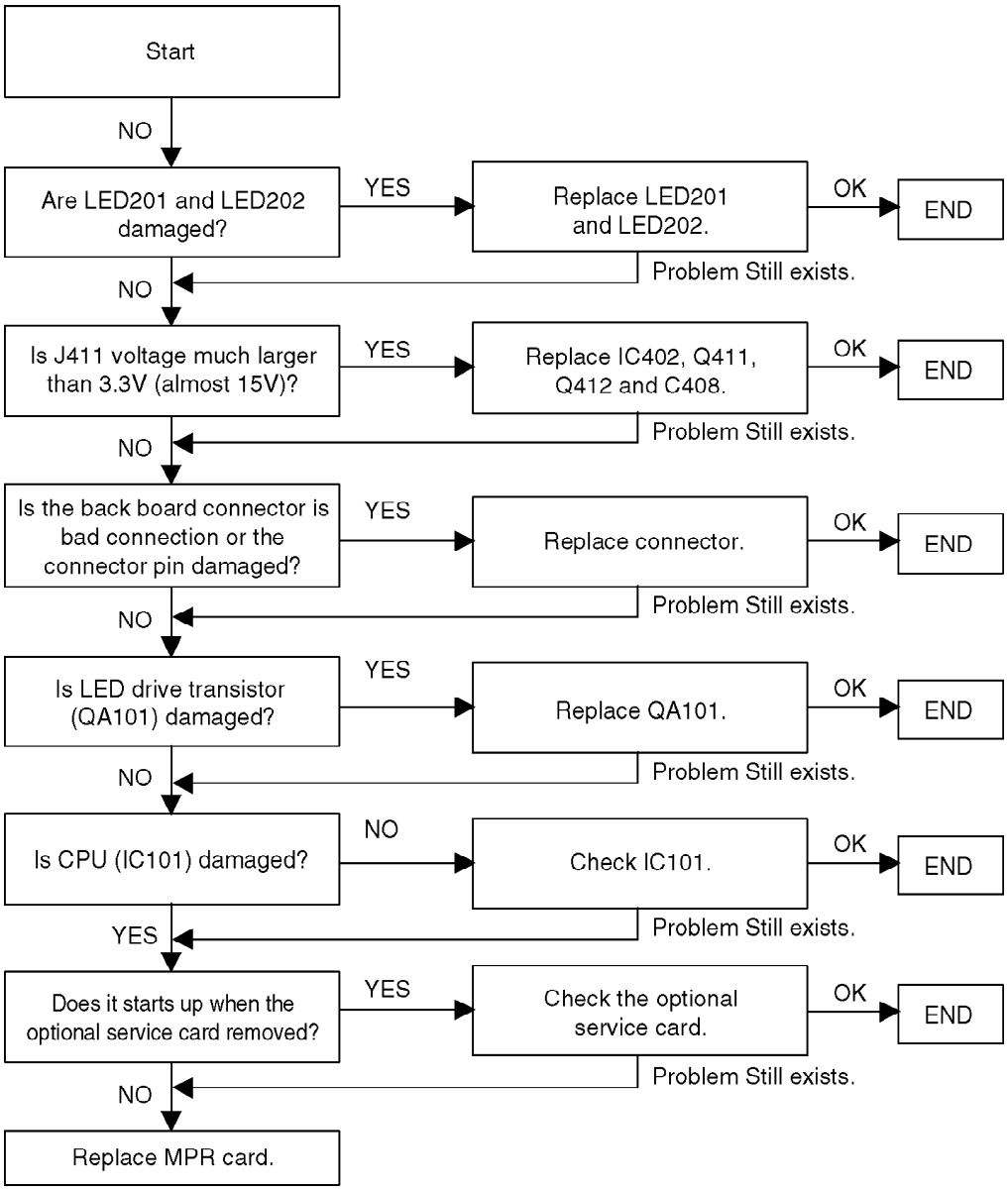
4. ALARM indicator is lit.



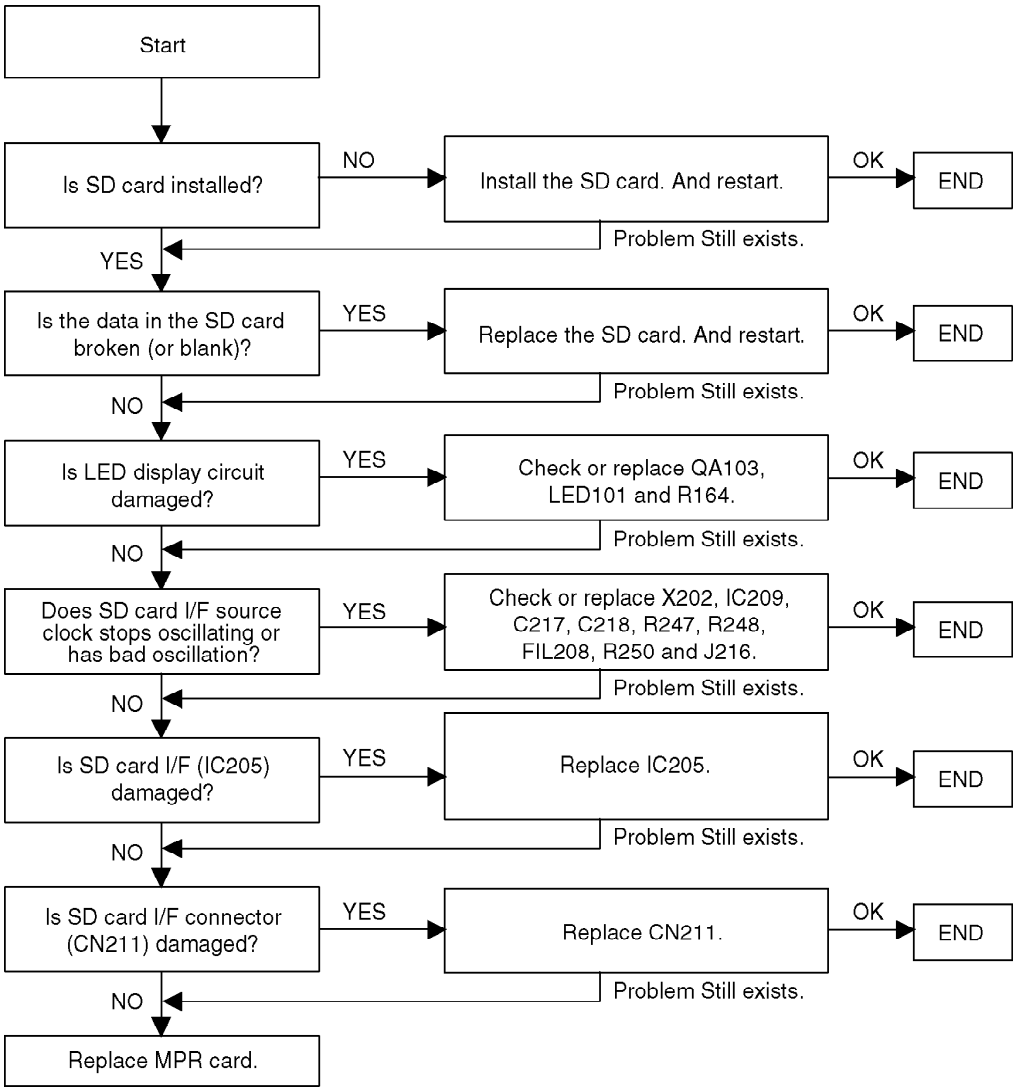
11.3. MPR CARD

11.3.1. Startup

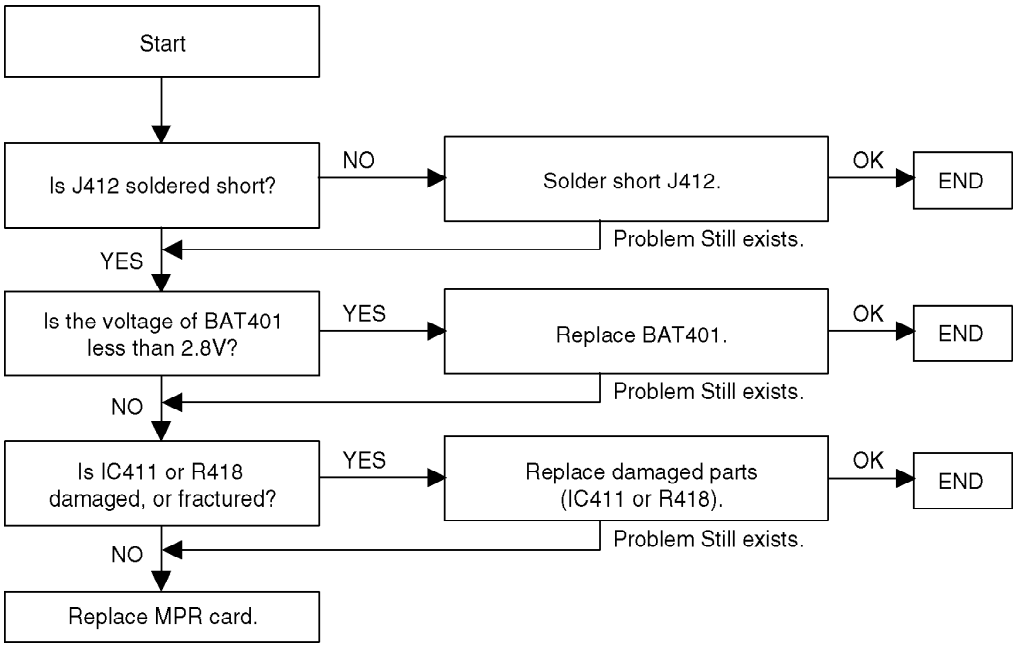
Run indicator (LED201)



SD card access light does not flash



The battery alarm indication light turns on

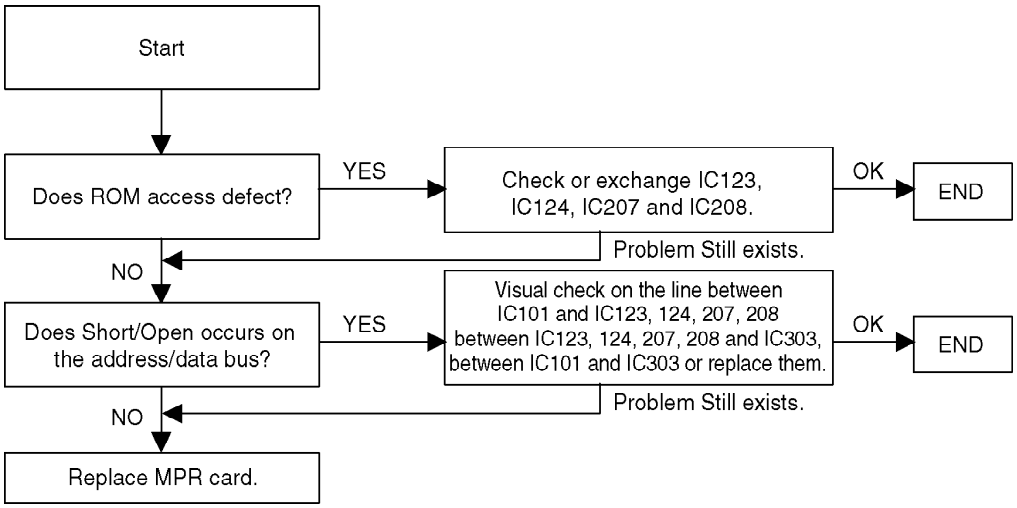


ALARM indicator flashes

- 1 blink and 1 interval

- 2 blinks and 1 interval

(1 blink is 0.5 sec. ON and 0.5 sec. OFF. 1 interval is 2 sec.)



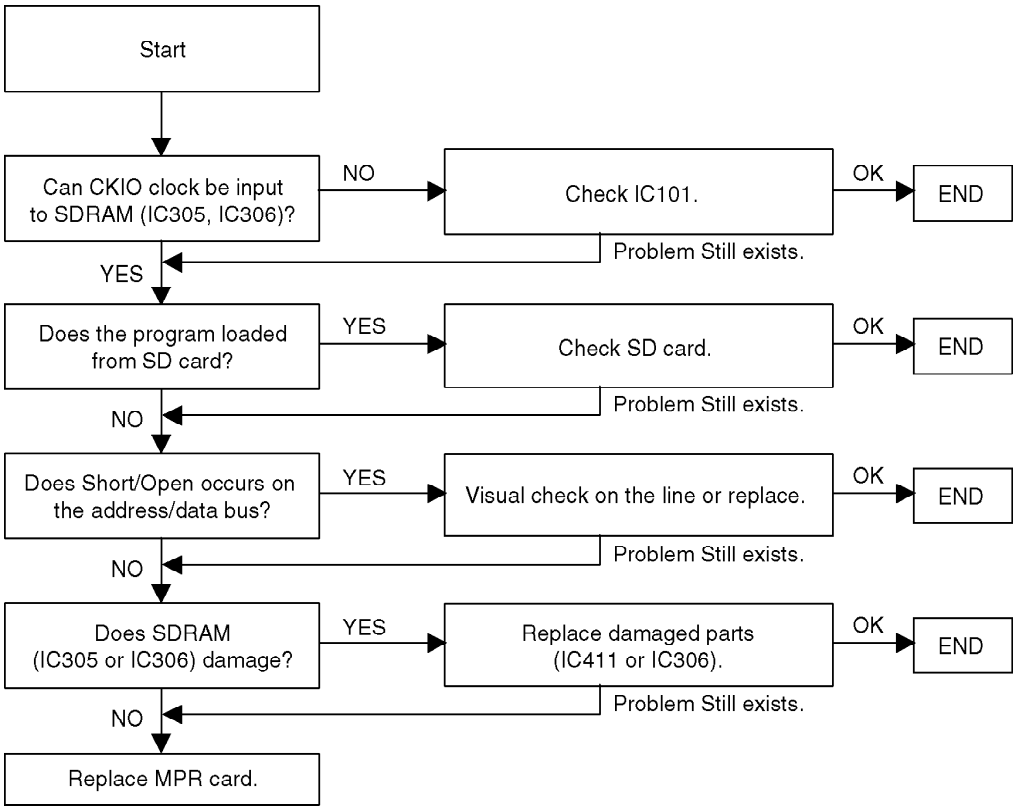
ALARM indicator flashes

- 3 blinks and 1 interval

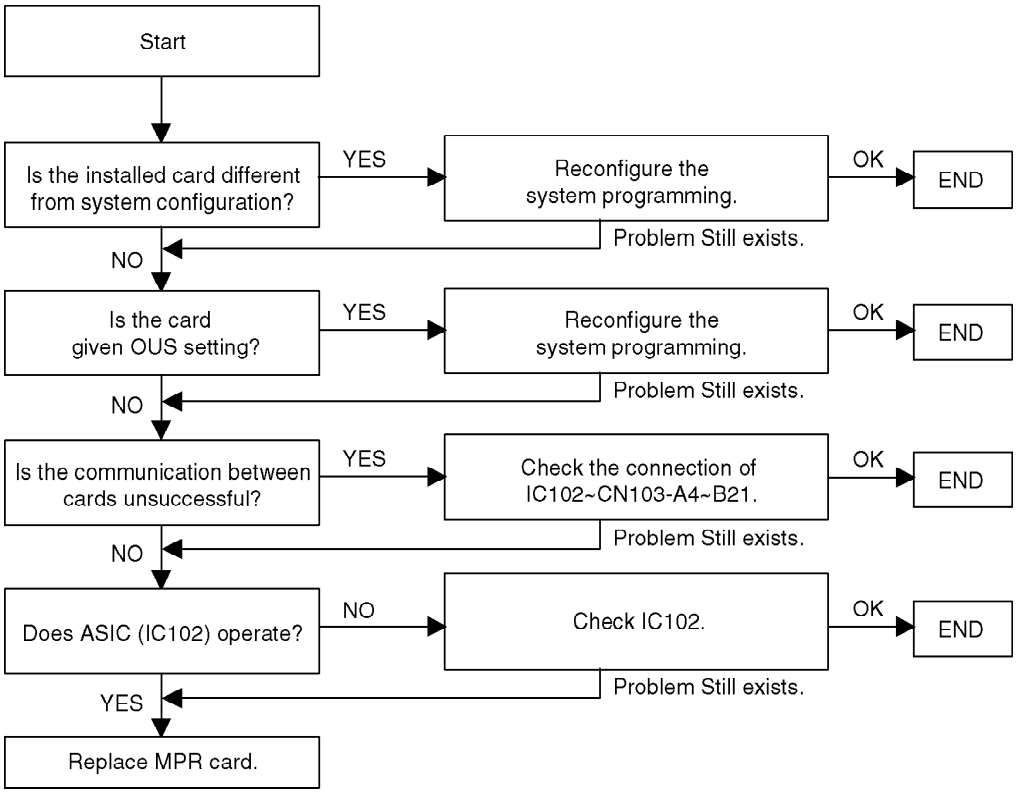
- 4 blinks and 1 interval

- 5 blinks and 1 interval

(1 blink is 0.5 sec. ON and 0.5 sec. OFF. 1 interval is 2 sec.)

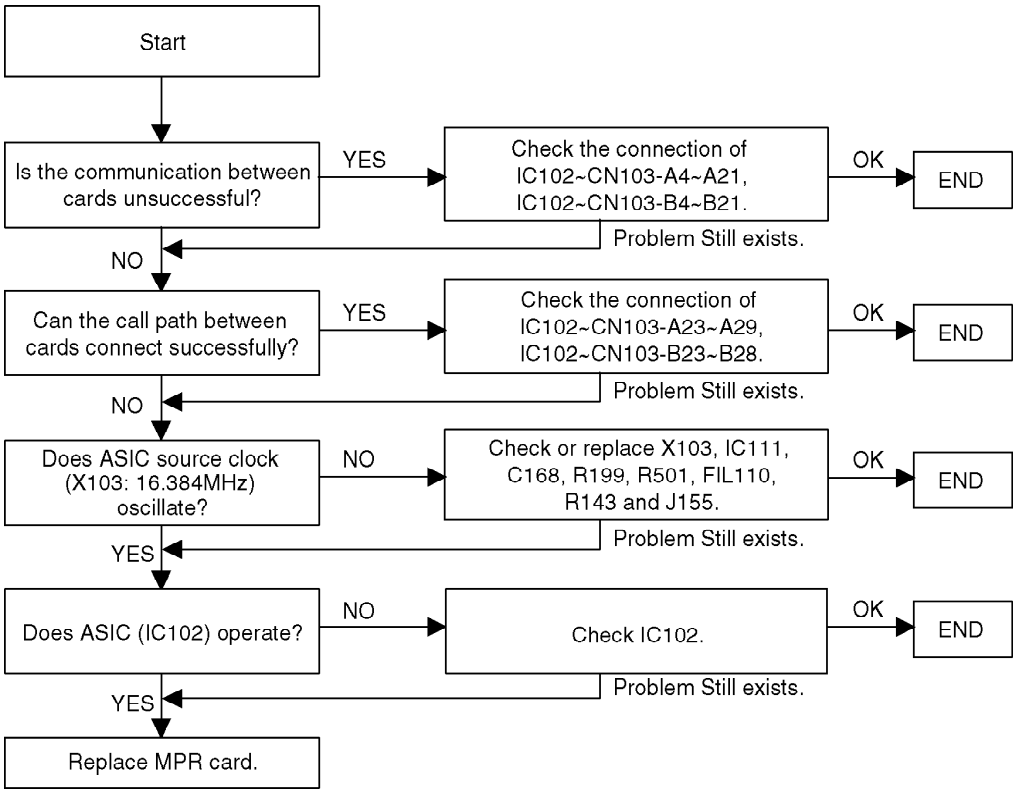


Optional service cards cannot start up

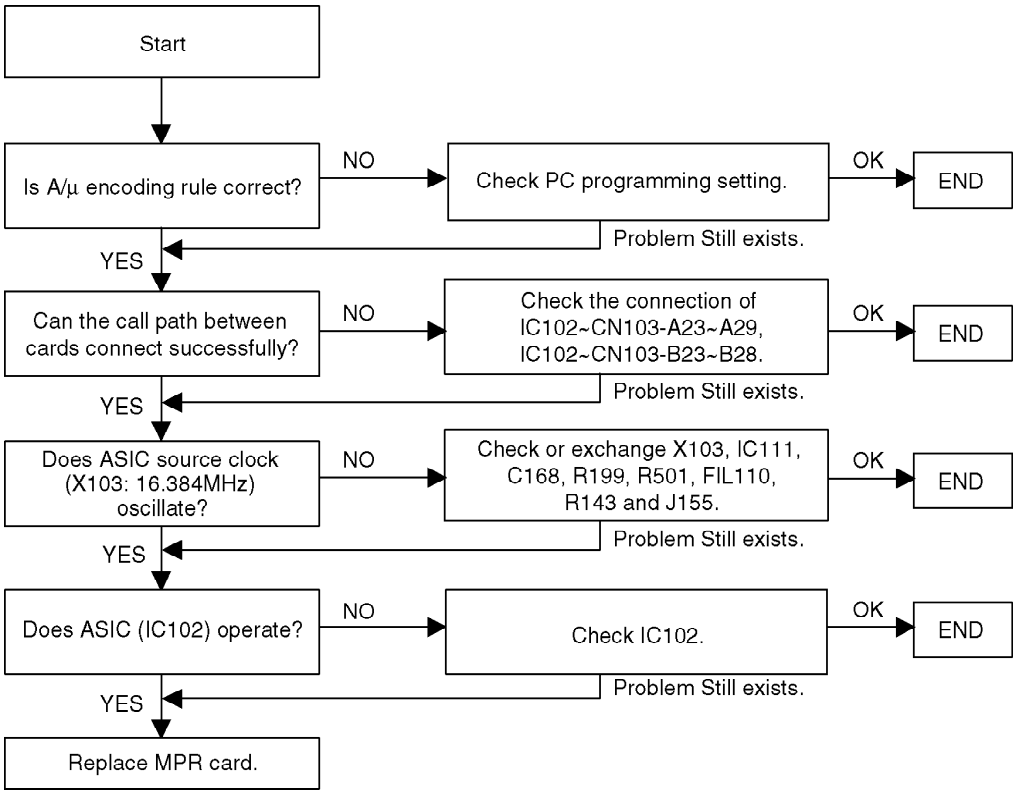


11.3.2. Phone Call

The call path cannot connect

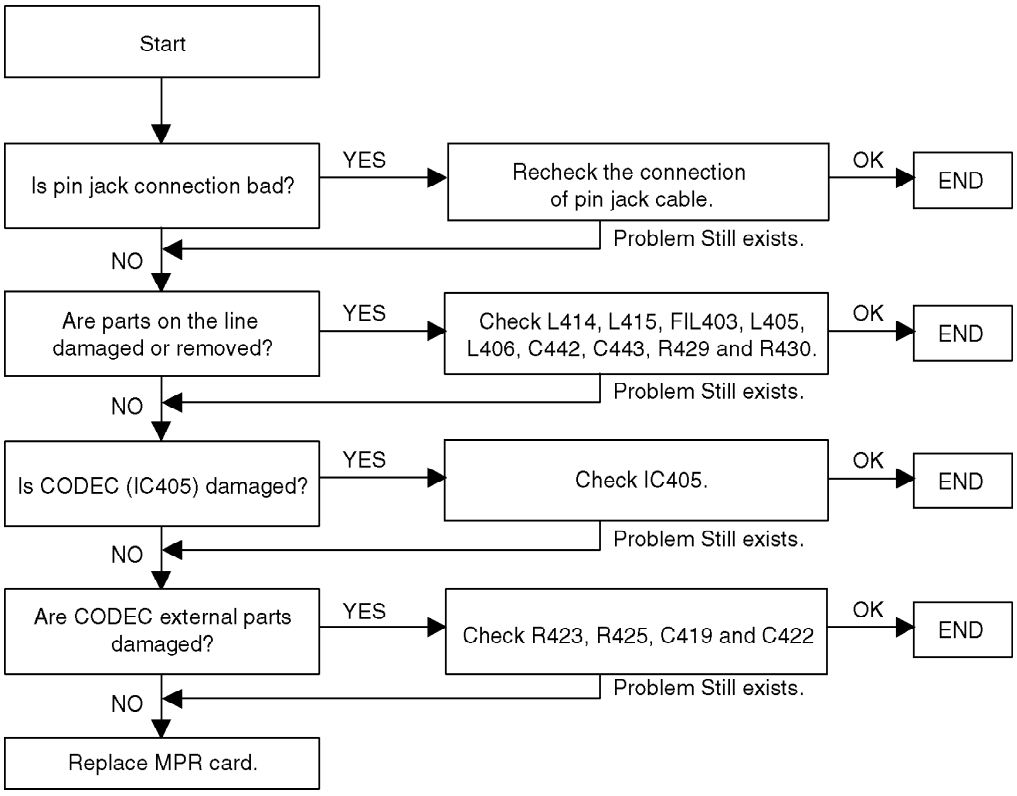


Noise is created

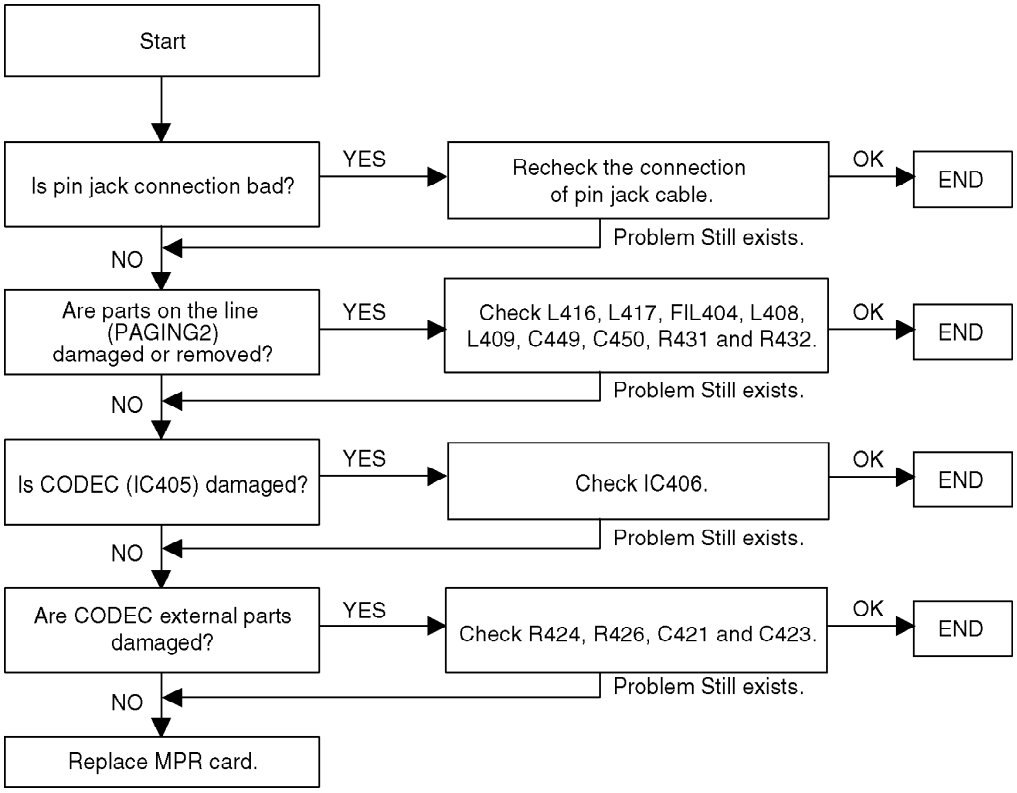


11.3.3. Paging

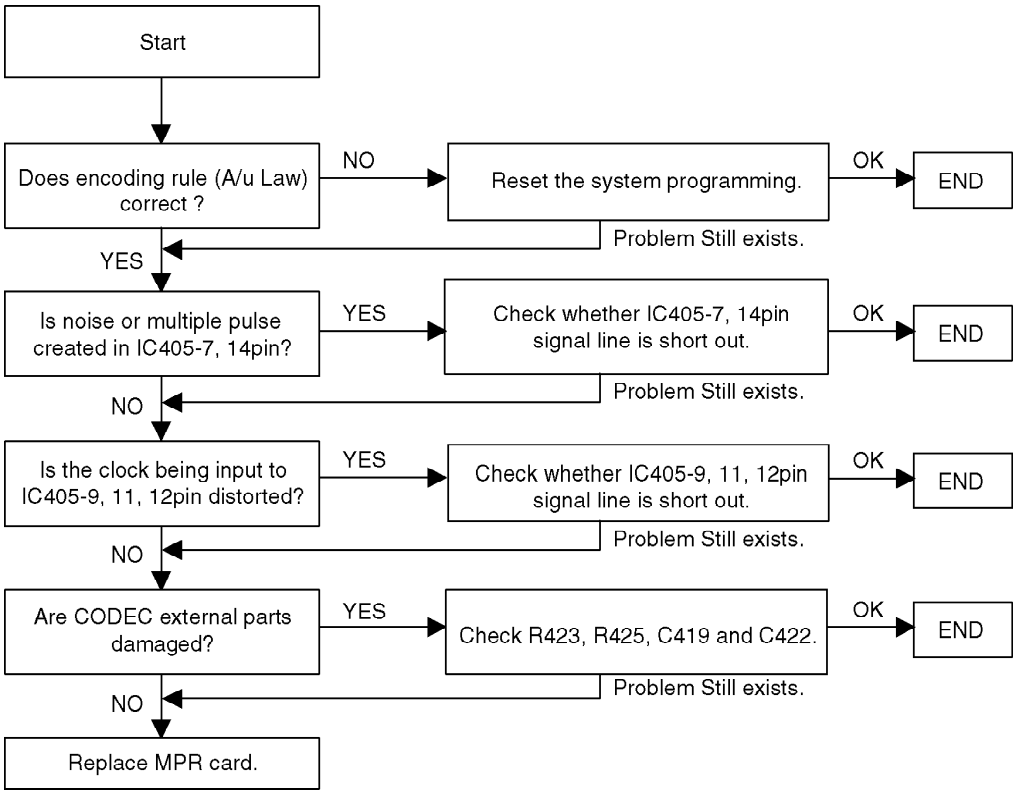
No sound (PAGING1)



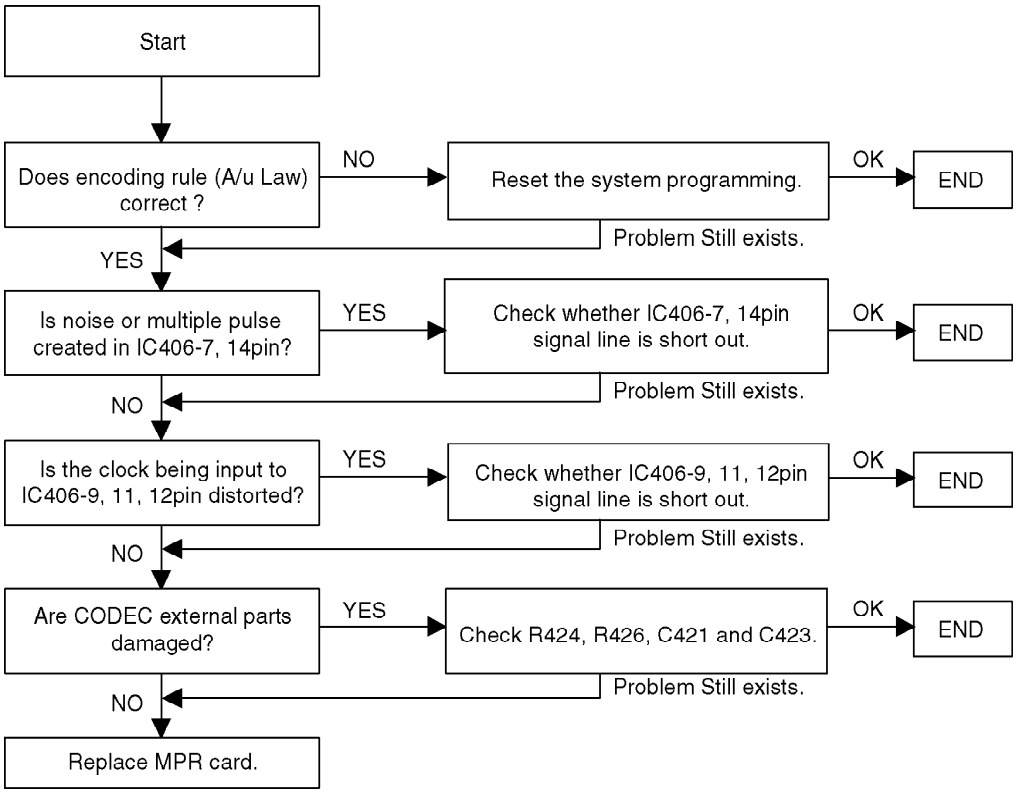
No sound (PAGING2)



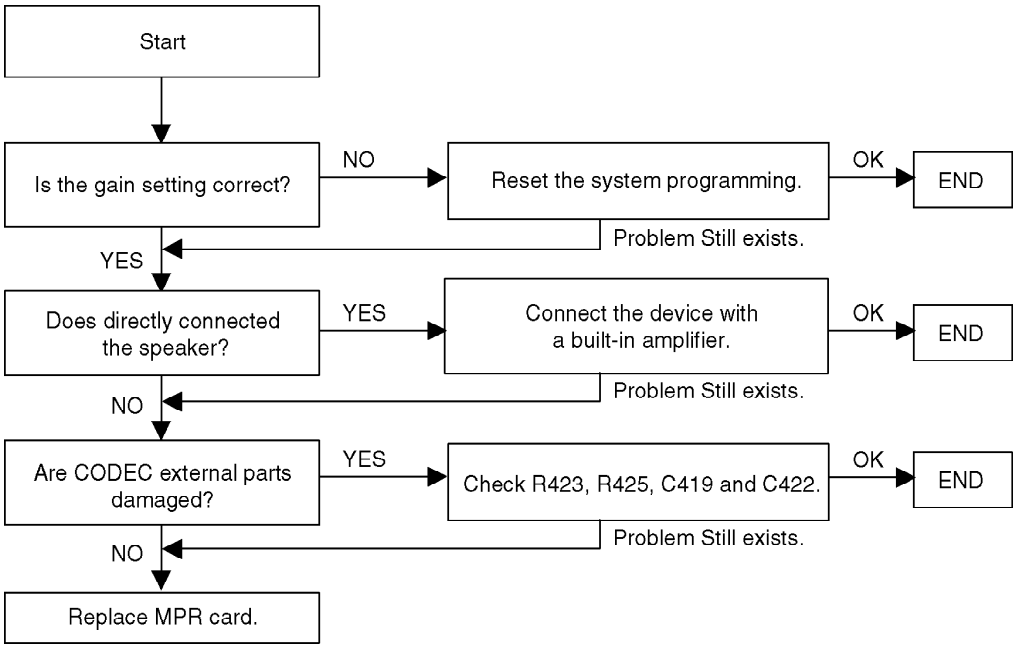
Noise is Heard (PAGING1)



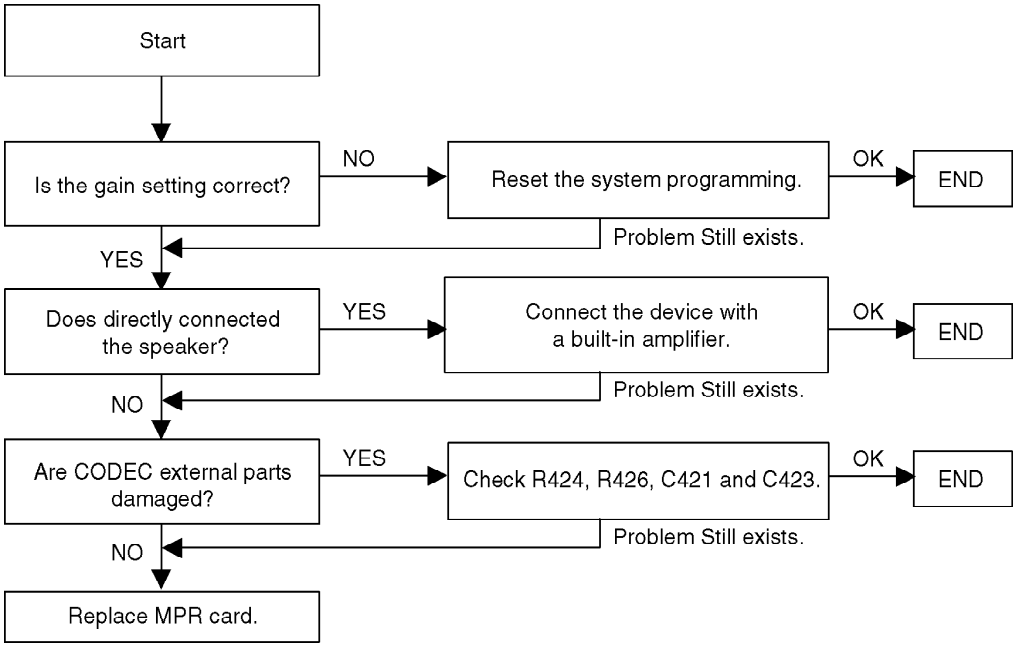
Noise is Heard (PAGING2)



Sound is small (PAGING1)

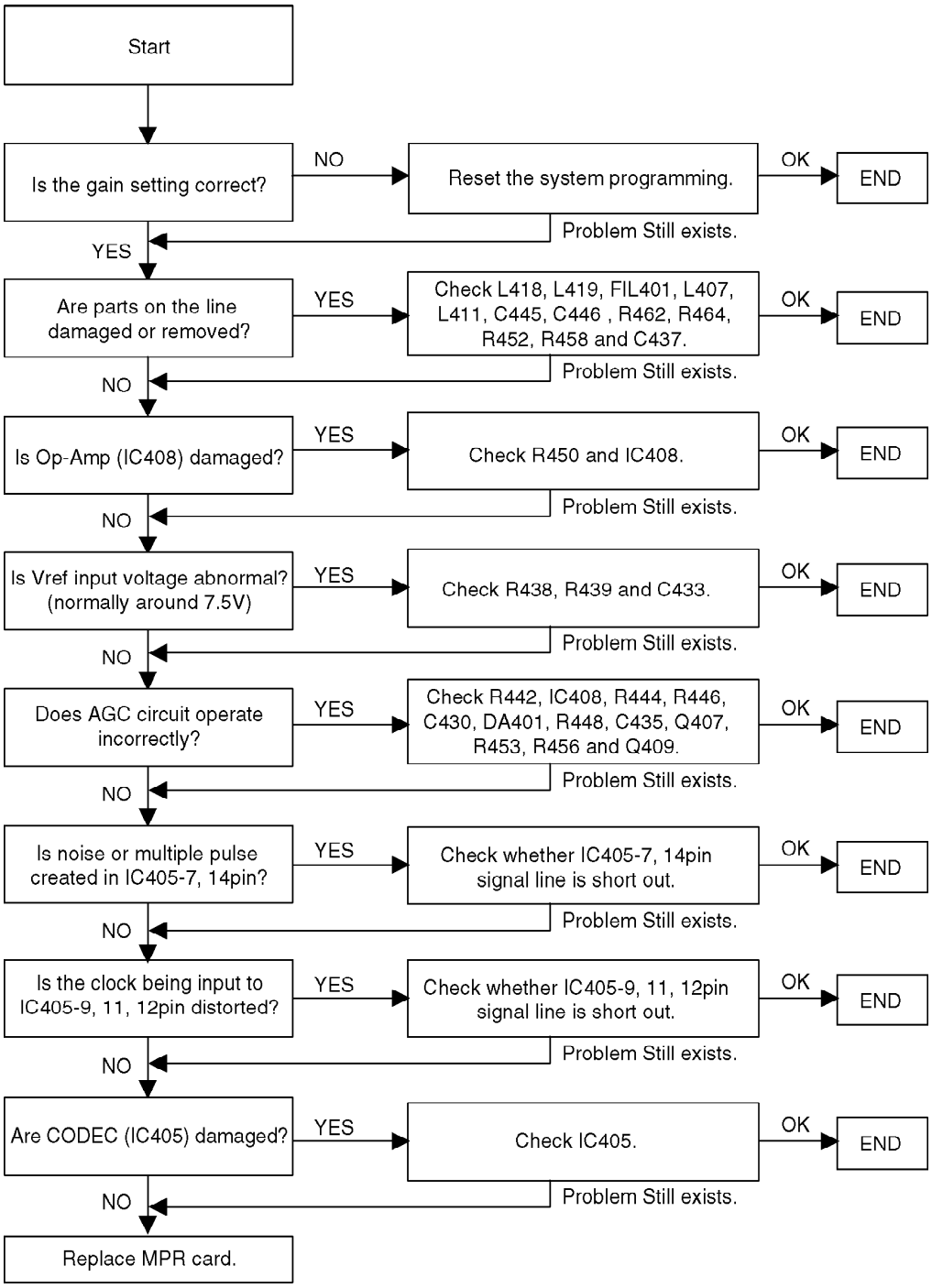


Sound is small (PAGING2)

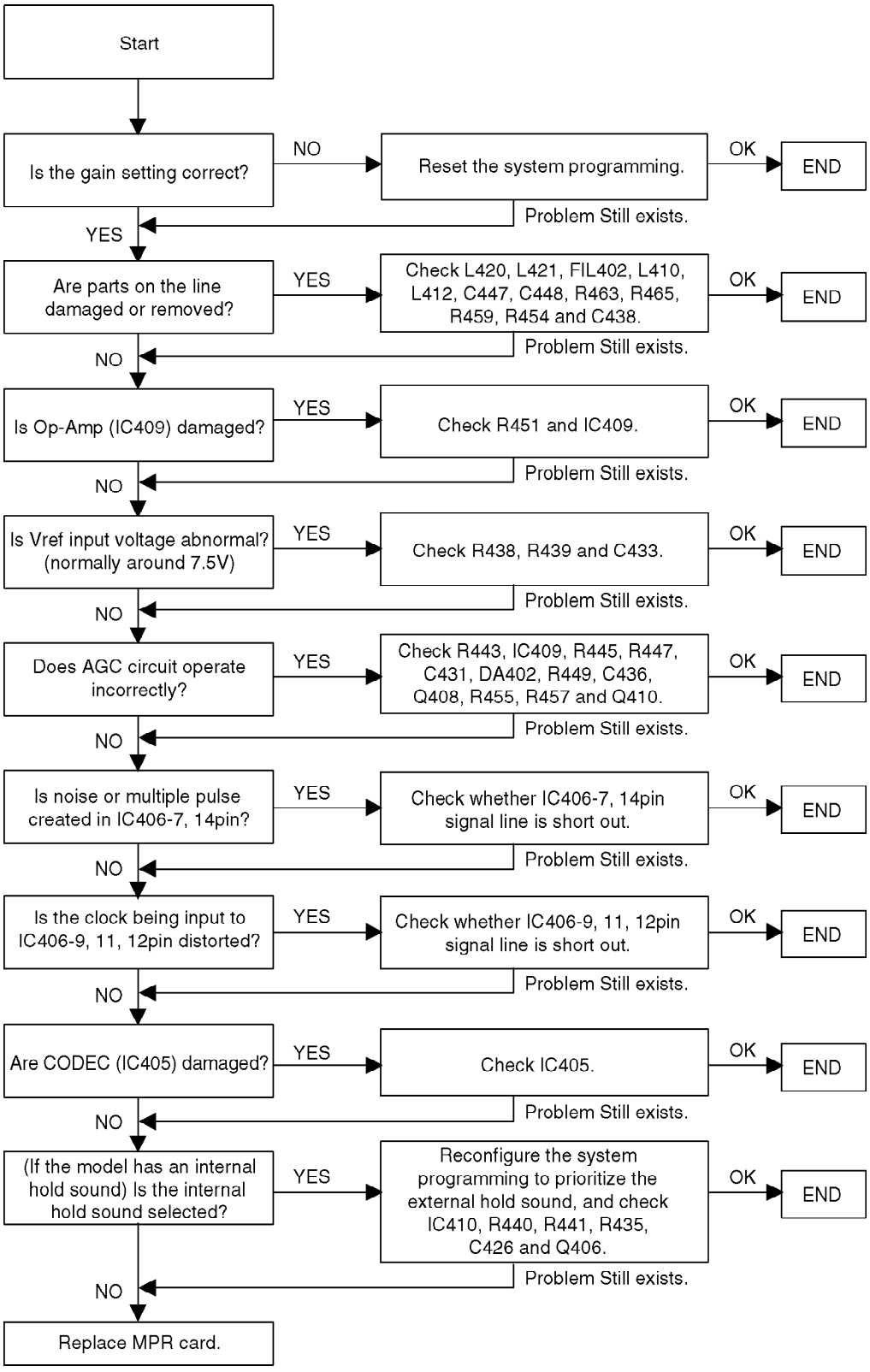


11.3.4. MOH Using

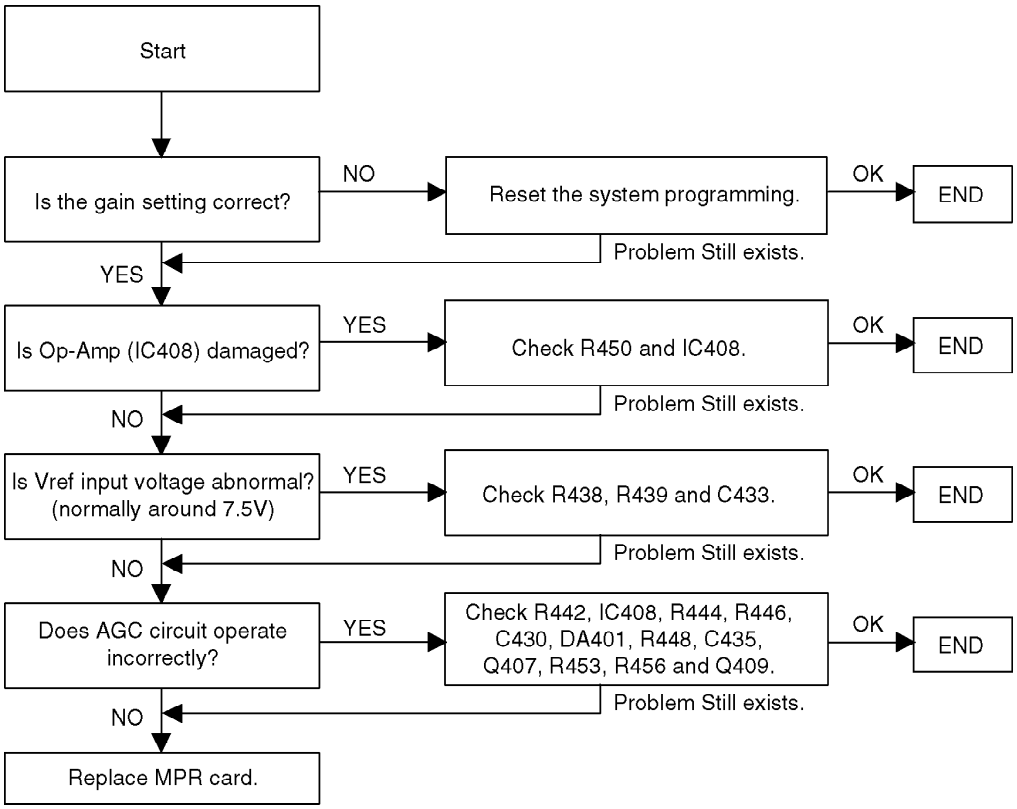
No sound is heard (MOH1)



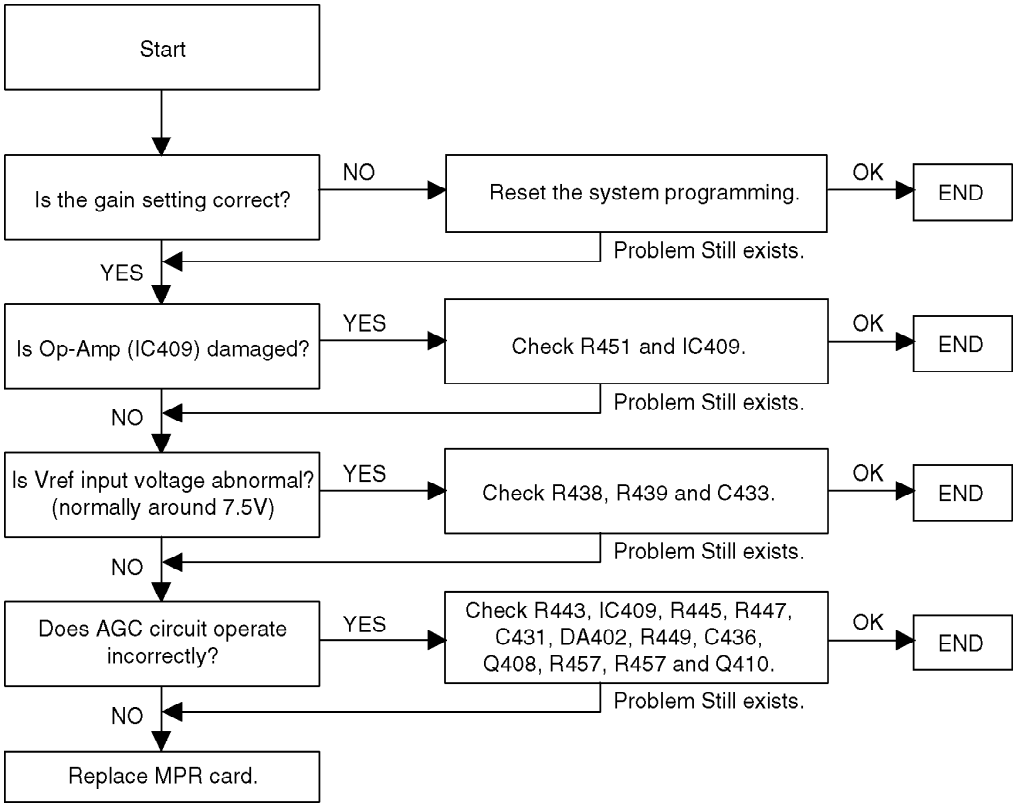
No sound is heard (MOH2)



Sound is small or loud (MOH1)

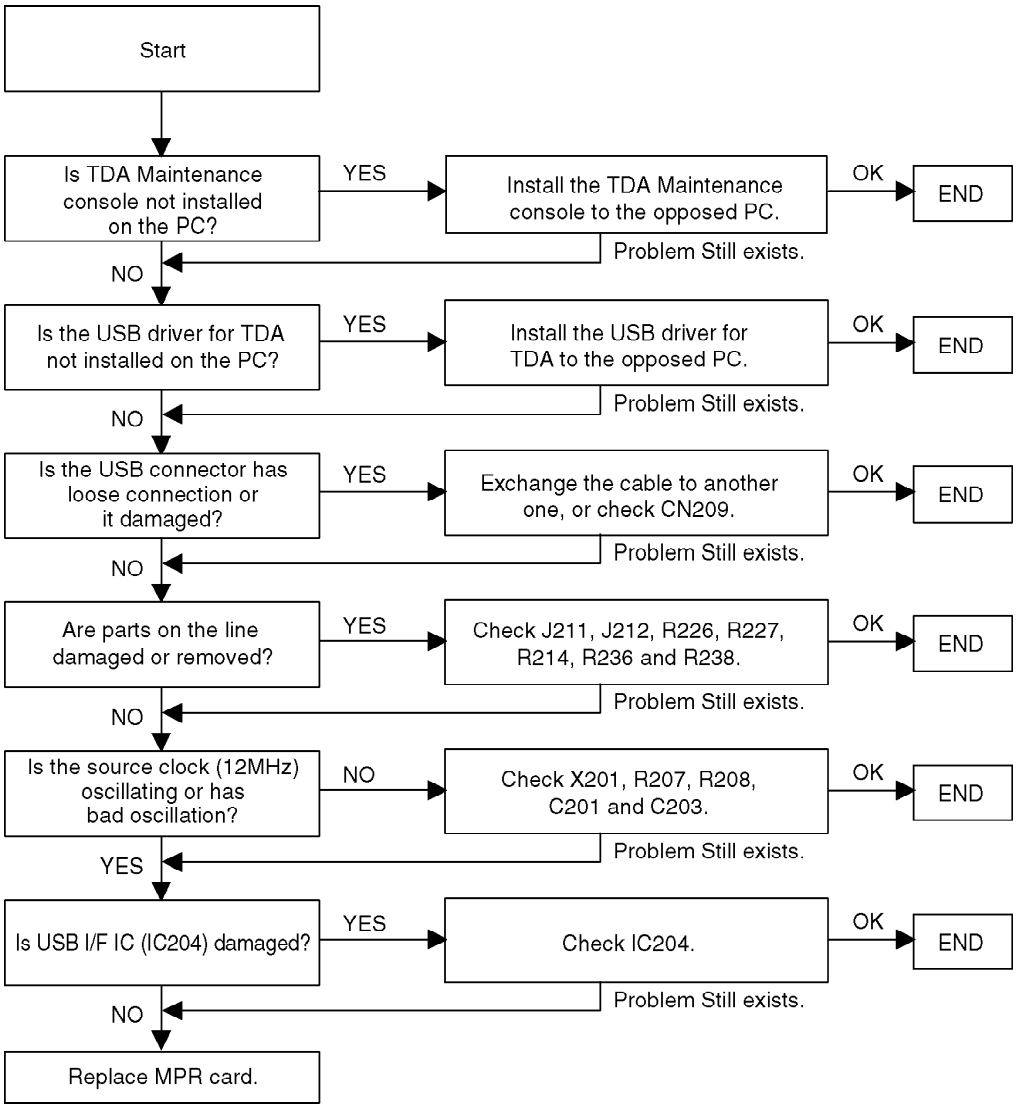


Sound is small or loud (MOH2)

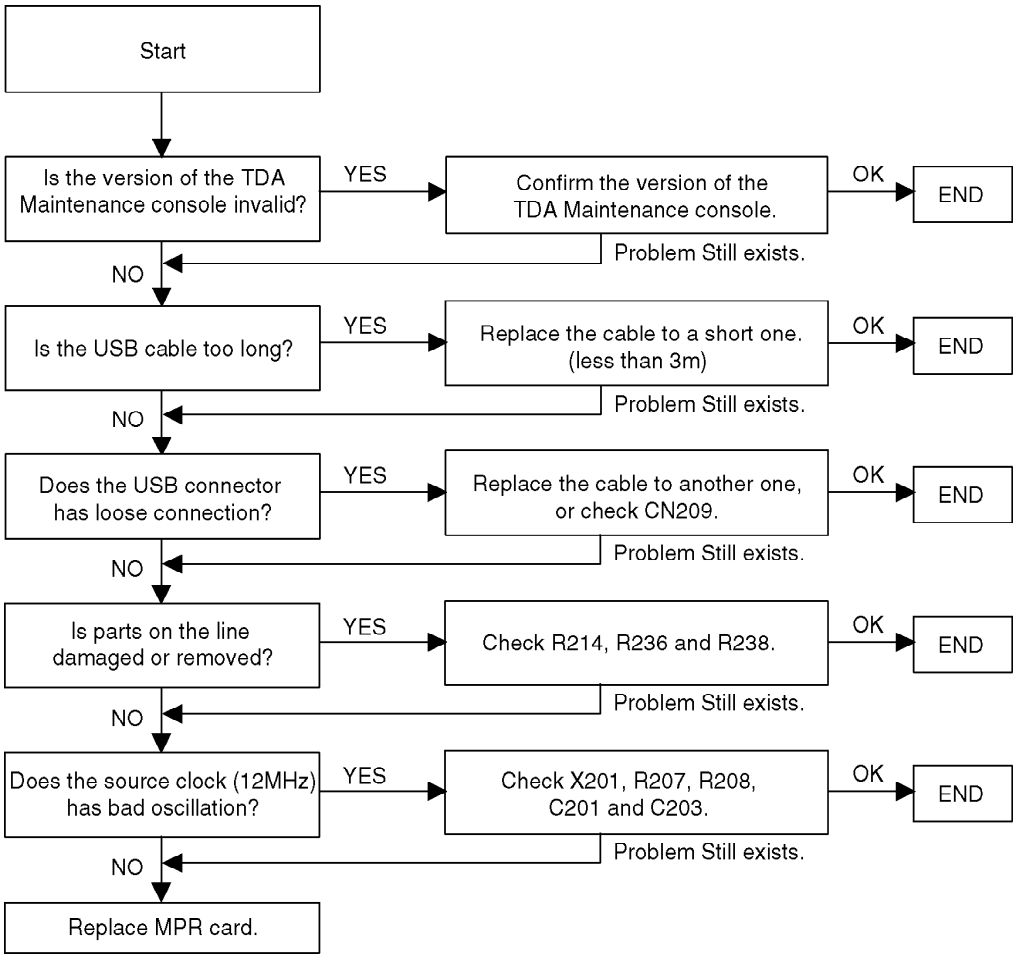


11.3.5. USB Connection

Unable to connect

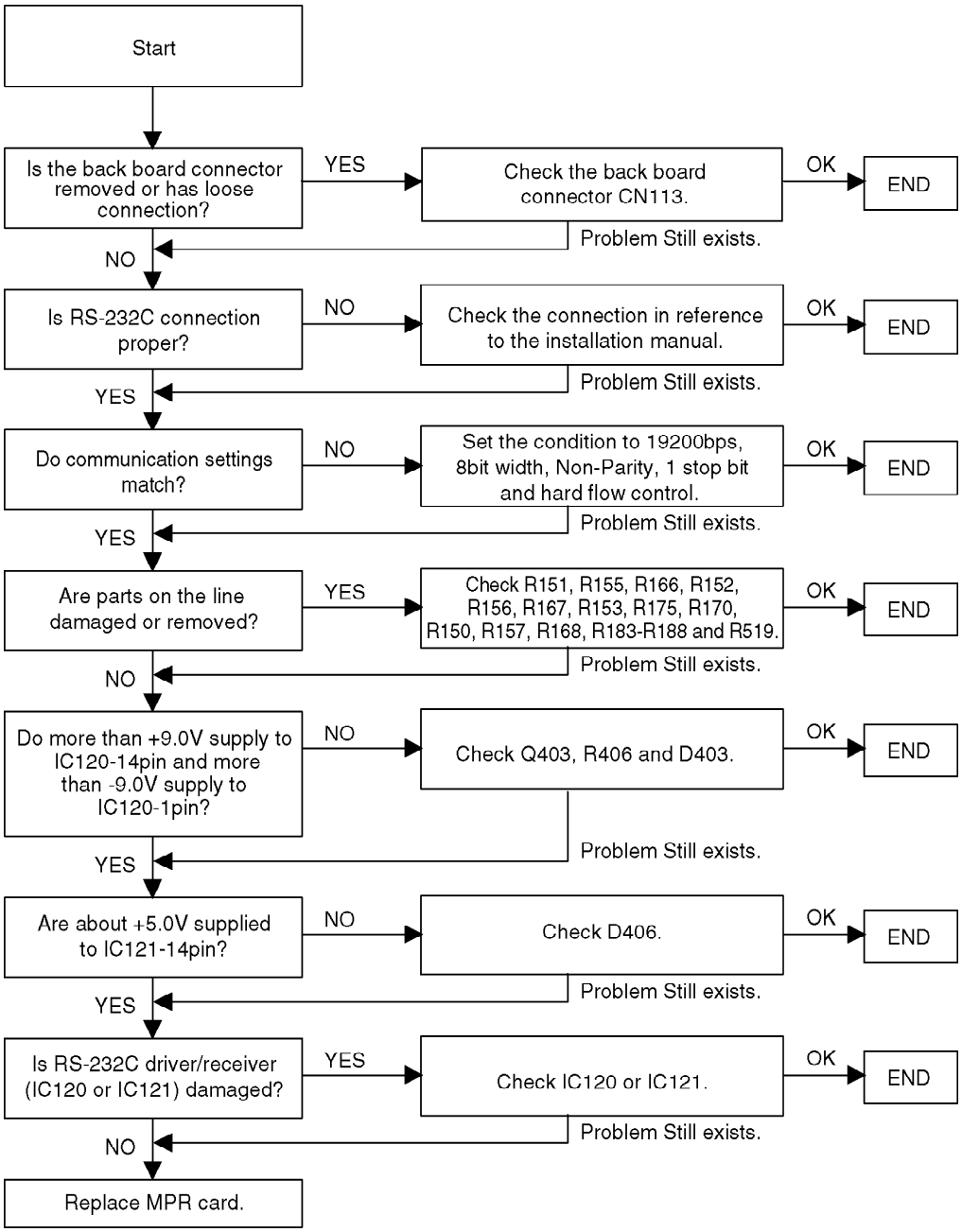


Connection error occurs

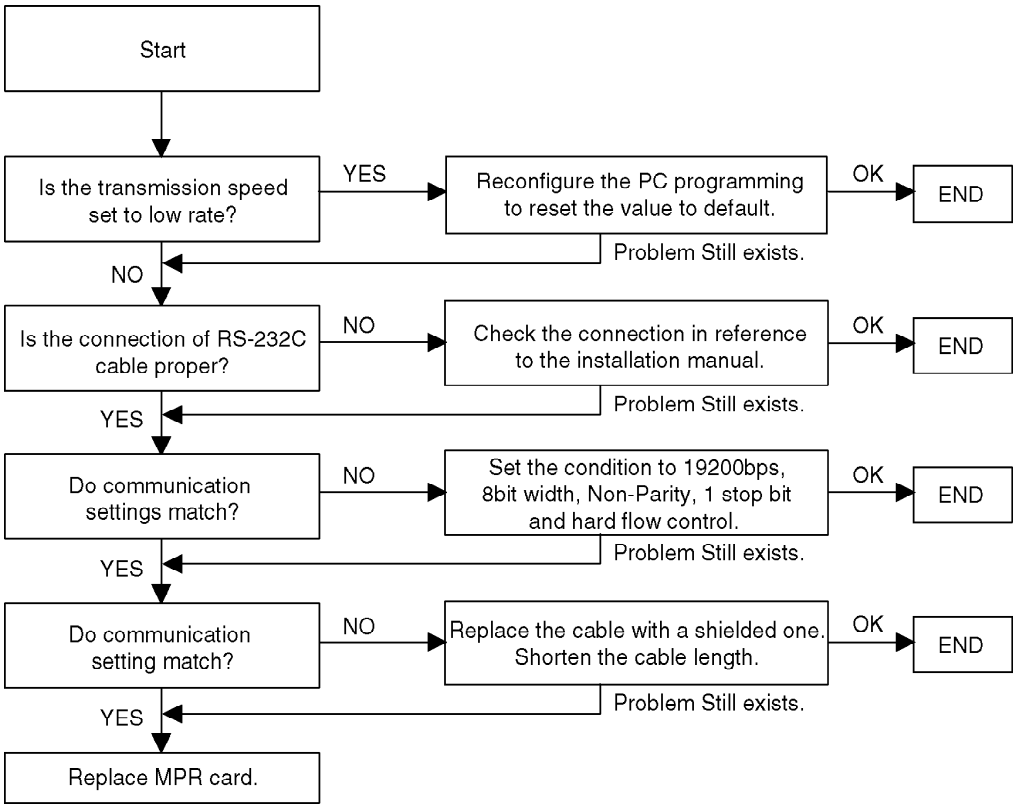


11.3.6. RS-232C Connection

Unable to connect

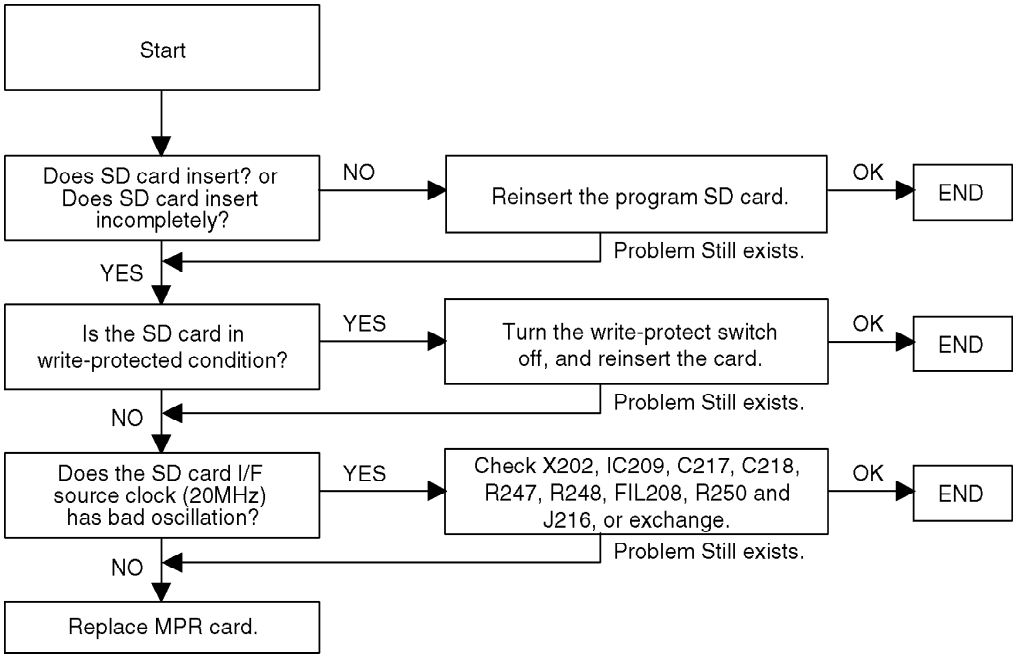


Connecting speed is slowly



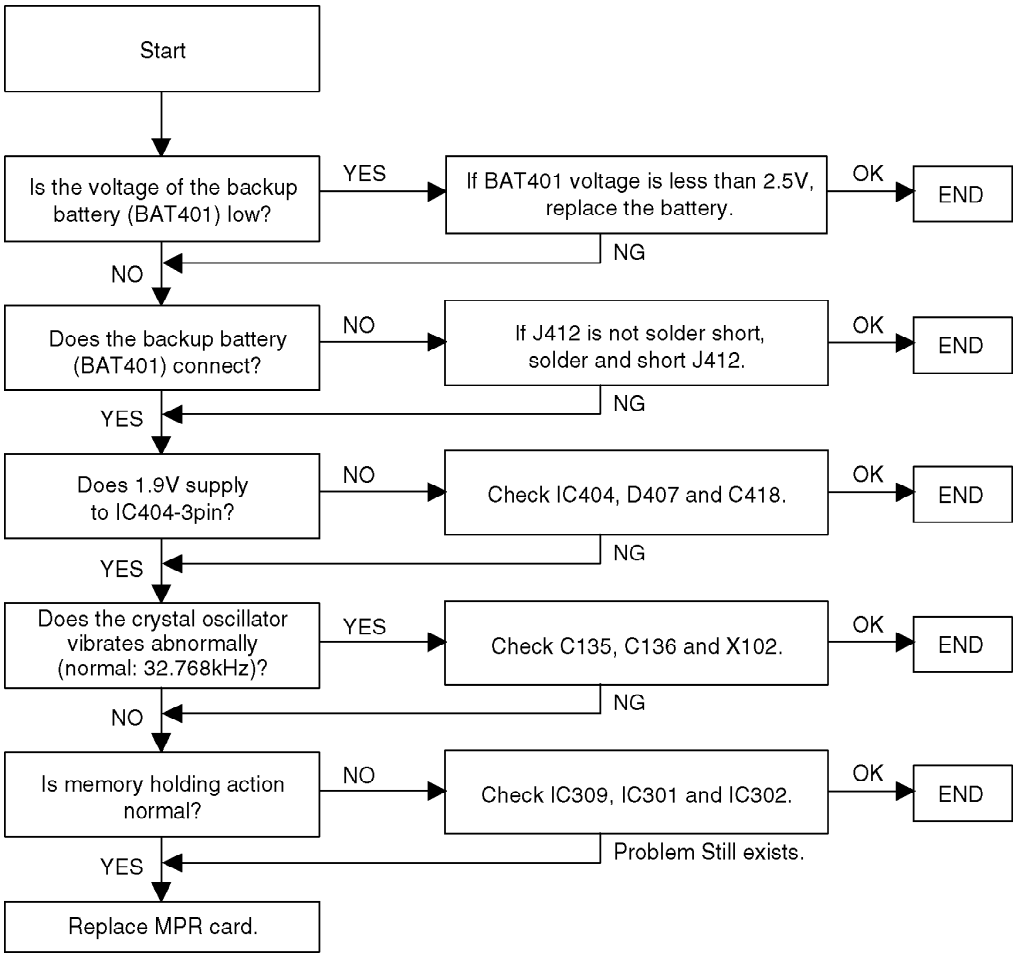
11.3.7. SD Card I/F

Unable to save the system data



11.3.8. Other

The clock data is deleted (unset table)

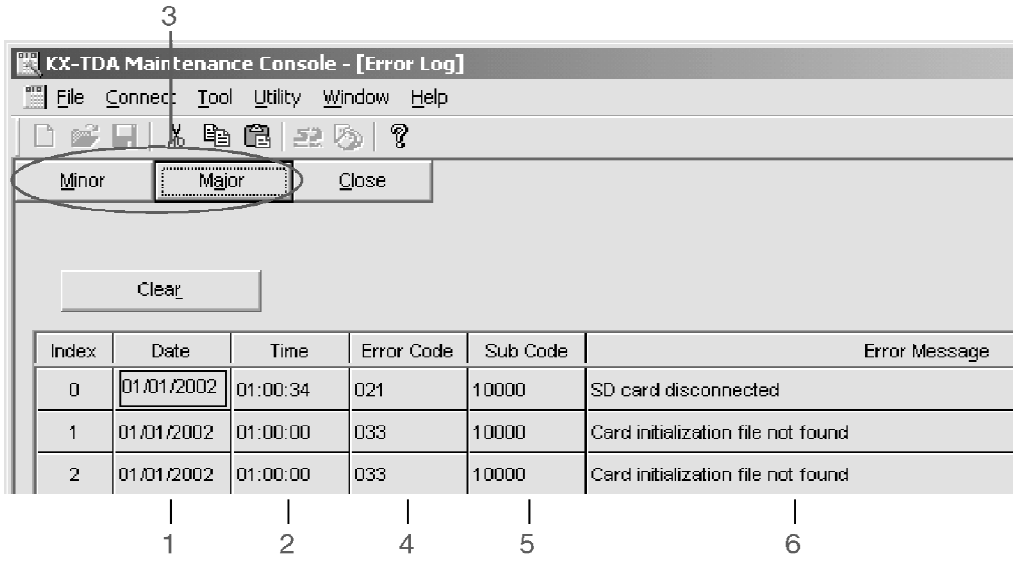


11.4. ERROR LOG

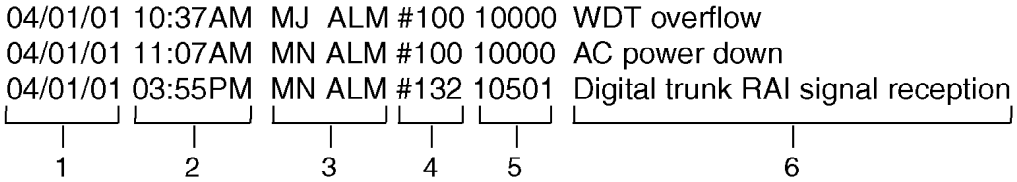
When a major system error occurs in the main unit (Hybrid IP-PBX), the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.

11.4.1. Error Log Display Format

Example: KX-TDA Maintenance Console



Example: Station Message Detail Recording (SMDR)



Description

	Item	Description
1	**Date**	**Date of the error detection**
2	**Time**	**Time of the error detection**
3	**Level**	**Major Alarm (MJ ALM):** **Errors that affect the whole system operation, or result in system failure** **Minor Alarm (MN ALM):** **Errors that affect certain part of system operation**
4	**Error Code**	**Three-digit error code**

	Item	Description
5	Sub Code	Five-digit sub code (XYYZZ) X: Cabinet number (1 to 4) YY: Slot number KX-TDA100: 00 to 06 (00: MPR slot; 01 to 05: Free slot; 06: Option slot) KX-TDA200: 00 to 11 (00: MPR slot; 01 to 10: Free slot; 11: Option slot) ZZ: Physical port number (01 to 16) For OPB3 card, sub slot number + port number will be displayed. Sub slot 1: 11 to 14 Sub slot 2: 21 to 24 Sub slot 3: 31 to 34 Note: When there is no parameter for slot and physical port number, YY and ZZ will be displayed as "00". Example: Sub code for MPR card = 10000
6	Error Message	Error description (maximum 36 characters)

11.4.2. List of Errors and Solutions

The tables below list the errors and their solutions.
When an error whose error code is indicated with "*" occurs in the main unit (Hybrid IP-PBX), the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.
When the error conditions indicated by the error codes "021", "091", "230", and "510" are recovered, the ALARM indicator will turn off automatically, indicating successful troubleshooting. When other errors are logged, the ALARM indicator will turn off only when the log for major or minor errors is cleared from the KX-TDA Maintenance Console.

In other words, the ALARM indicator will turn off under the following conditions:

- **When the errors "021", "091", "230", and "510" are logged: when the error conditions are recovered**
- **When other errors are logged: when the log for major or minor errors is cleared from the KX-TDA Maintenance Console**

MPR Card Initial Self Diagnosis

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
100	SRAM readwrite error	-MPR card malfunction	-See if the MPR card is installed properly -Press the Reset Button -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
101	Flash write error		
102	Flash boot check error		
103	SDRAM eadwrite error		
104	ASIC local bus register access error		
105	ASIC CT bus HW NG		
106	ASIC Local HW0 NG		
108	SD card not mounted	-SD Memory Card not installed -Defective data in SD Memory Card -MPR card malfunction	-See if the SD Memory Card is installed properly -Replace the SD Memory Card -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
109	ASIC HDLC error	-MPR card malfunction	-See if the MPR card is installed properly -Press the Reset Button -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
110	ASIC DMAC error		

LPR (Optional Service Card with Local Processor) Initial Self Diagnosis

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
210	ASIC local bus register access error	-Optional service card malfunction: DHLC, DLC, CSIF, T1, PRI, OPB3, CTI-LINK, E&M, IP-GW	-See if the corresponding optional service card is ins properly -Pull out and re-insert the corresponding optional ser -Press the Reset Button -Replace the corresponding optional service card
211	Speech path loop-back check error	-Optional service card malfunction: DHLC, DLC, SLC, CSIF, LCOT, T1, PRI, OPB3, CTI-LINK, E&M, IP-GW	
212	Echo cancellor access error	-Optional service card malfunction: CSIF, ECHO	
213	CSINF frame sync. error		
214	DSP Boot check error	-Optional service card malfunction: T1	
215	Framer IC access error	-Optional service card malfunction: T1, PRI	
216	MSG card DSP error	-Optional service card malfunction: MSG, OPB3	

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
217	MSG card data error	-Optional service card malfunction: MSG, OPB3 -Erroneous recording of messages	-See if the corresponding optional service card is ins properly -Pull out and re-insert the corresponding optional ser -Press the Reset Button -Re-record the messages -Replace the corresponding optional service card
218	LANC register access error	-Optional service card malfunction: CTI-LINK	-See if the corresponding optional service card is ins properly -Pull out and re-insert the corresponding optional ser -Press the Reset Button -Replace the corresponding optional service card
219	PT I/F error	-Optional service card malfunction: DHLC, DLC -Software error due to external factors -Breaking of telephone cord/ interference of noise	-See if the corresponding optional service card is ins properly -Pull out and re-insert the corresponding optional ser -Press the Reset Button -Check the wiring -Replace the corresponding optional service card

System Start-up and On-line Operation

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
000*	MPR WDT overflow	-MPR card malfunction -Erroneous processing of MPR card software -Software error due to external factors	-Press the Reset Button -Reprogram the main unit (Hybrid IP-PBX) -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
001	SDRAM bit error		
002	System Reset	-Reset Button is pressed -Power failure -MPR card malfunction -Erroneous processing of MPR card software -Software error due to external factors	-Ignore if not frequent -Press the Reset Button -Reprogram the main unit (Hybrid IP-PBX) -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
010*	AC power down	-Power supply system malfunction (e.g., power failure, power noise, trouble with UPS) -Bad connection or breaking of AC cord -Power supply circuit (PSU, back board) malfunction	-Check the power supply system -See if the AC cord is connected properly -Check the AC cord -Replace the AC cord (be sure to turn off the main un PBX) when replacing) -Replace the PSU (be sure to turn off the main unit (H PBX) when replacing) -Replace the back board (be sure to turn off the main IP-PBX) when replacing)
011*	DC power down	-AC power down -Power supply circuit (PSU, back board) malfunction -Detection of over current (short circuit on optional service cards)	-Check the power supply system -See if the AC cord is connected properly -Check the AC cord -Replace the AC cord (be sure to turn off the main un PBX) when replacing) -Replace the PSU (be sure to turn off the main unit (H PBX) when replacing) -Replace the back board (be sure to turn off the main IP-PBX) when replacing) -Remove the optional service cards and restart the m (Hybrid IP-PBX)

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
012*	MPR RAM battery low	-Battery out -MPR card malfunction	-Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
014*	FAN Alarm	-PSU-L malfunction	-See if anything is jammed in the fan -Replace the PSU (be sure to turn off the main unit (H PBX) when replacing)
016	CS overload	-Defective cable -CS malfunction -Optional service card malfunction: CSIF	-Check the cable diameter and length -Replace the CS -Replace the corresponding optional service card
018	CS superframe synchronization failure	-Optional service card malfunction: CSIF	-Replace the corresponding optional service card
020*	SD file access error	-SD Memory Card malfunction -Bad connection of SD Memory Card -MPR card malfunction	-Press the Reset Button -Reprogram the main unit (Hybrid IP-PBX) -Replace the SD Memory Card -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
021*	SD Memory Card disconnected	-SD Memory Card not installed -Bad connection of SD Memory Card -SD Memory Card malfunction -MPR card malfunction	
022*	Not enough free space on SD card	-Not enough memory space available to save the system data, or to upload system files from the KX-TDA Maintenance Console	-Delete the files whose file names start with "$" from Card -Delete the "Pxxx" files (old program files of optional cards) from SD Memory Card. "xxx" indicates the car "PDHLC" for DHLC card) **Note:** **Do not delete the "PMPR" file; it is the program file of the MPR card.**

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
023*	System data file version error	-Old system files on SD Memory Card -Defective system files on SD Memory Card	-Restore the backup files -Re-install the software
024*	System initialization file version error		
025*	Card initialization file version error		
026*	LCD file version error		
027*	System data file checksum error		
028*	System initialization file checksum error		
029*	Card initialization file checksum error		
030*	LCD file checksum error		
031*	System data file not found	-SD Memory Card not installed -Bad connection of SD Memory Card -SD Memory Card malfunction -MPR card malfunction	-Press the Reset Button -Reprogram the main unit (Hybrid IP-PBX) -Replace the SD Memory Card -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
032*	System initialization file not found		
033*	Card initialization file not found		
034*	LCD file not found		
035*	System data file access error		
036*	System initialization file access error		
037*	Card initialization file access error		
038*	LCD file access error		
040	Calendar IC failure	-Erroneous processing of calendar IC of MPR card -MPR card malfunction	-Reset the system clock -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
090	Card limitation over	-Too many optional service cards installed	-Reduce the number of optional service cards

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
091	PT connection over	-Too many PTs connected	-Reduce the number of PTs
200	LPR start up error (ROM NG)	-Optional service card malfunction: DHLC, DLC, CSIF, T1, PRI, OPB3, CTI-LINK, E&M, IP-GW	-Pull out and re-insert the corresponding optional ser -Press the Rest Button -Replace the corresponding optional service card
201*	LPR start up error (RAM NG)		
202*	LPR start up error (No Program)	-Optional service card malfunction: DHLC, DLC, CSIF, T1, PRI, OPB3, CTI-LINK, E&M, IP-GW	-Pull out and re-insert the corresponding optional ser -Press the Rest Button -Update the software of the corresponding optional s -Replace the corresponding optional service card
203*	LPR start up error (Version NG)		
204*	LPR start up error (Version NG)		
205*	LPR start up error (No response)		
206	LPR start up error (Card type NG)		
207	LPR start up error (Check SUM NG)		
230*	Card disconnected	-Optional service card not installed properly -Optional service card malfunction -Back board malfunction	-See if the corresponding optional service card is ins properly -Pull out and re-insert the corresponding optional ser -Press the Rest Button -Replace the corresponding optional service card -Replace the back board (be sure to turn off the main IP-PBX) when replacing)
231	LPR alive check error	-Optional service card malfunction: DHLC, DLC, CSIF, T1, PRI, OPB3, CTI-LINK, E&M, IP-GW -Back board malfunction -MPR card malfunction	-See if the corresponding optional service card is ins properly -Pull out and re-insert the corresponding optional ser -Press the Rest Button -Replace the corresponding optional service card -Replace the back board (be sure to turn off the main IP-PBX) when replacing) -Replace the MPR card (be sure to turn off the main u IP-PBX) when replacing)
232	MPR-LPR communication error		
233	LPR data check error		
234	DPLL clock failure		
235*	CS clock failure	-Optional service card malfunction: CSIF	-Replace the corresponding optional service card
250	T1/E1 DSP failure	-Optional service card malfunction: T1	-See if the corresponding optional service card is ins properly -Replace the corresponding optional service card
251	MSG DSP failure	-Optional service card malfunction: MSG	

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
300*	Digital trunk out of synchronization	-Network (digital CO line) malfunction -Optional service card malfunction: PRI, T1, CTI-LINK -Wrong A/B switch setting: PRI, T1	-Check the signals from the networkd is installed pro -Check the cable -See if the A/B switch is set to A on the correspondin service card -See if the corresponding optional service card is ins properly -Replace the corresponding optional service card
301*	Digital trunk RAI reception		
302*	Digital trunk AIS reception		
303*	Multiframe out of synchronization		
304*	Frame error		
305*	Data Link failure	-Data link between the CS and CSIF card failed -Data link between the network and PRI card failed	-Check the connection between the CS and CSIF carc -Check the connection between the network and PRI
307	LAN No Carrier	-IP-GW card not connected to the LAN	-Check the connection between the LAN and IP-GW c
310*	Port Link Failure	-Voice Mail malfunction -Ports defective on optional service card: DHLC, DLC	-Check the Voice Mail -See if the corresponding optional service card is ins properly -Replace the corresponding optional service card
390	Digital signal synchronization established	-Synchronization of digital line established or restored	-This information is logged when synchronization of established, and does not indicate an error condition to be solved
391	Data Link established	-Connection with PC Phone/PC Console or Voice Mail (DTMF Integration) established or restored	-This information is logged when connection with PC Console or Voice Mail (DTMF Integration) is establish does not indicate an error condition that needs to be However, if this is logged frequently (with "305 Data L failure"), check the connection as it may not be done
392	Clock master card selected	-Clock master card has been changed to the one indicated by the sub code	-Check if the proper card is selected as the new clocl card
510*	SMDR disconnect	-RS-232C cable not connected -Breaking of RS-232C cable -Printer (terminal equipment) malfunction	-Check the RS-232C cable -Check the terminal equipment

12. DIAGNOSIS

12.1. DIAGNOSIS FEATURES

Card Test and Pair Port Test is in Diagnosis Features.

- This test is started manually in order to analyze types of trouble.
- This test is conducted in response to commands which have been supplied from KX-TDA Maintenance console.
- This test is conducted on conference circuits (TSW cards) and line cards.
- This test is particularly useful for checking the CO ports and

extension ports.

- This test results are indicated on TDA Maintenance console.

12.1.1. Card Test

Card Test -SUMMARY
Description
Diagnose all kind of Cards.

Parallel of Diagnose item of Card Tests and every Cards

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Local loop back diagnosis	X	X	X	X	X	X	X	X	X	X	
Card CT bus diagnosis	X	X	X	X	X	X	X	X	X	X	
DTMF receive test	X		X	X						X	
PT loop back diagnosis	X	X									
DSP DTMF generator/ receiver diagnosis							X				
DSP DTMF receiver diagnosis							X				
Framer IC alarm signal detection diagnosis							X	X			
Framer IC error detection diagnosis							X	X			
CS-INF loop back diagnosis					X						
Super frame synchronization diagnosis					X						
Caller ID card loop back diagnosis						X					
Extension mode setting test											
CTI-LINK loop back diagnosis											X

12.1.1.1. Local Loop Back Diagnosis

Diagnose by first transmitting data from the MPR to the card, then perform a loop-back test to return the data to the MPR.
The point to do Loop back is different from the every cards, be able to do full diagnosis by Loop back test on the every points.

Local loop back diagnosis test

Primary circuit	**Primary circuit loop back test**
Framer IC ST path (Analog)	**IC Analog I/F loop back test**
Framer IC (Digital)	**IC Digital I/F loop back test**
ASIC CODEC (PITS)	**PITS I/F test loop back**
Local HW I/F point	**Local HW I/F loop back test**
Local TSW point	**Local TSW loop back test**

Local loop back diagnosis test of every Cards

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Primary circuit							X	X			
Framer IC ST path (Analog)							X				
Framer IC (Digital)							X	X			
ASIC CODEC (PITS)											
Local HW I/F point			X	X		X	X	X	X	X	
Local TSW point	X	X	X	X	X	X	X	X	X	X	

Diagnosis result of every test points

OK	**loop back diagnosis OK**
NG	**loop back diagnosis NG**

12.1.1.2. Card CT Bus Diagnosis

Diagnose CT bus by Loop back test to use CT bus

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Object of Card	X	X	X	X	X	X	X	X	X	X	X

Diagnosis result

OK	**Card CT bus diagnosis OK**
NG	**Card CT bus diagnosis NG**

12.1.1.3. DTMF Receive Test

Diagnosis DTMF receiver

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Object of Card	X		X	X						X	

Diagnosis result

OK	DTMF receive test OK
NG	DTMF receive test NG

12.1.1.4. PT Loop Back Diagnosis

Diagnosis PT by Loop back test

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Object of Card	X	X									

PT loop back diagnosis test channel

Cch port xx	C channel Port No.xx test
Dch port xx	D channel Port No. xx test
Bch port xx	B channel Port No. xx test

PT loop back diagnosis test

Primary circuit	Primary circuit loopback test
ASIC (PT I/F)	PT I/F loopback test

Diagnosis result

OK	PT loop back diagnosis OK
NG	PT loop back diagnosis NG

12.1.1.5. DSP DTMF Generator / Receiver Diagnosis

Diagnosis DTMF generator/receiver of DSP in the Card

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Object of Card							X				

diagnosis point

Time slot	Time slot test
Primary circuit	Primary circuit loop back test
DSP ST loop back	DSP ST point loop back test
DSP digital loop back	DSP digital point loop back test

Diagnosis result

OK	DSP DTMF generator/receiver diagnosis OK
NG	DSP DTMF generator/receiver diagnosis NG

12.1.1.6. DSP DTMF Receiver Diagnosis

Diagnose DTMF receiver of DSP in the Card to use DTMF generator of DSP

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card							X				

Diagnosis point

Time slot	Time slot test
Primary circuit	Primary circuit loop back test
DSP ST loop back	DSP ST point loop back test
DSP digital loop back	DSP digital point loop back test

Diagnosis result

OK	DSP DTMF generator/receiver diagnosis OK
NG	DSP DTMF generator/receiver diagnosis NG

12.1.1.7. Framer IC Alarm Signal Detection Diagnosis

Diagnose the feature to detect the alarm signal of Framer IC is normal action.

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card							X	X			

Diagnosis point

RAI	Yellow alarm signal detection test
AIS	Blue alarm signal detection test
Primary circuit	Primary circuit alarm signal detection test

Diagnosis result

OK	Framer IC alarm signal detection diagnosis OK
NG	Framer IC alarm signal detection diagnosis NG

12.1.1.8. Framer IC Error Detection Diagnosis

Diagnose the feature to detect the alarm signal of Framer IC is normal action.

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card							X	X			

Diagnosis point

Bipolar violation error	Bipolar violation error detection test
CRC error	CRC error detection test
Framing error	Framing error detection test
Primary circuit	Primary circuit error detection test

Diagnosis result

OK	DSP DTMF generator/receiver diagnosis OK
NG	DSP DTMF generator/receiver diagnosis NG

12.1.1.9. CS-INF Loop Back Diagnosis

Diagnose by Loop back test to CS-INF

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card					X						

CS-INF loop back diagnosis test channel

Dch port xx	D channel Port No. xx test
Bch port xx	B channel Port No. xx test

Diagnosis point

DNIC analog	DNIC analog loop back test
DNIC digital	DNIC digital loop back test

Diagnosis result

OK	CS-INF loop back diagnosis OK
NG	CS-INF loop back diagnosis NG

12.1.1.10. Super Frame Synchronization Diagnosis

Diagnose Super frame synchronization feature of CS-INF

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card					X						

Diagnosis point

DECT	DECT super frame synchronization test
SS	SS super frame synchronization test

Diagnosis result

OK	Super frame synchronization diagnosis OK
NG	Super frame synchronization diagnosis NG

12.1.1.11. Caller ID Card Loop Back Diagnosis

Diagnose by Loop back test to Caller ID card (Optional Card of LCOT)

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card						X					

Diagnosis result

OK	Caller ID card loop back diagnosis OK
NG	Caller ID card loop back diagnosis NG

12.1.1.12. Extension Mode Setting Test

Diagnose the normal change from outside line mode to inside line mode

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card											

Diagnosis result

OK	Extension mode setting test OK
NG	Extension mode setting test NG

12.1.1.13. CTI-LINK Loop Back Diagnosis

Diagnose by Loop back test to CS-INF

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card											X

Diagnosis result

OK	CTI-LINK loop back diagnosis OK
NG	CTI-LINK loop back diagnosis NG

12.1.2. Pair Port Test

Pair Port Test -SUMMARY
Description
Diagnosis Pair Port Test to pair up inside line and outside line

	DHLC	DLC	SLC8/ LSLC8	MSLC / SLC16	CS-INF	LCOT	T1	PRI	OPB3	E&M	CTI-LINK
Card	X		X	X		X					

Diagnosis result

OK	Pair Port Test OK
NG	Pair Port Test NG

Detail Diagnosis result

Line current OFF (Ext-> CO)	There is no local current from inside line to outside line
Line current ON (Ext-> CO)	There is local current from inside line to outside line
Off hook detection (CO-> Ext)	Off-hook detection from outside line to inside line
DTMF detection (CO-> Ext)	DTMF transmission/detection from outside line to inside line
DP detection (CO->Ext)	SP transmission/detection from outside line to inside line
BELL detection (Ext->CO)	Bell transmission/detection from inside line to outside line
Speech path (Ext->CO)	Call lime from inside line to outside line
Speech path (CO->Ext)	Call lime from outside line to inside line

12.2. DIAGNOSIS TEST

1. Click [Diagnosis] of [Utility].

2. Pair Port Test operation Select card for Test.

3. Click [Pair Port Test].

4. Click [OK].

5. Click [Cancel].

6. Card Test operation Select card for Test.

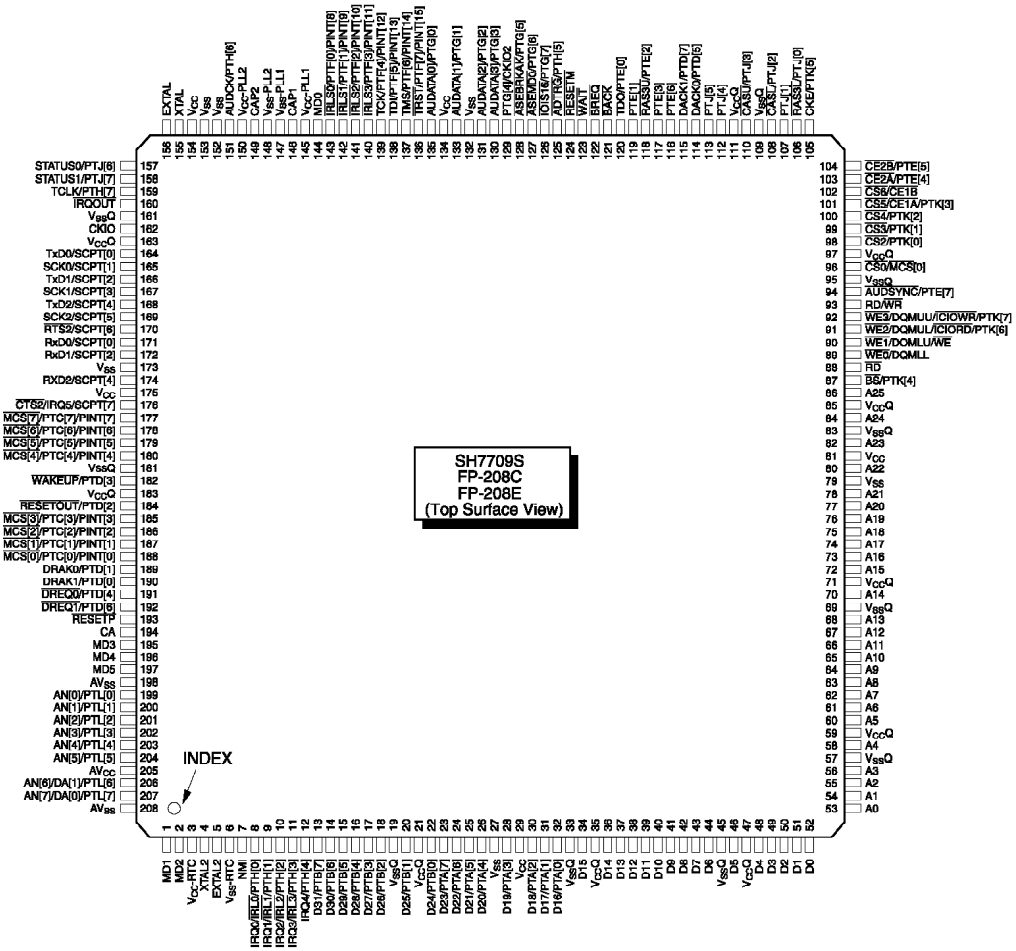
7. Click [Card Test].

8. Click [OK].

9. Click [Cancel].

13. IC DATA

13.1. IC101



Pin No.	Pin Name	I/O	Description
1	MD1	I	Clock mode setting
2	MD2	I	Clock mode setting
3	Vcc-TRC*1	-	Power for RTC
4	XTAL2	O	Crystal oscillator terminal for built-in RTC
5	EXTAL2	I	Crystal oscillator terminal for built-in RTC (*6)
6	Vcc-TRC*1	-	Power for RTC
7	NMI	I	Nonmaskable interrupt request
8	IRQ0/IRL0/ PTH[0]	I	External interrupt request/input port H
9	IRQ1/IRL1/ PTH[1]	I	External interrupt request/input port H
10	IRQ2/IRL2/ PTH[2]	I	External interrupt request/input port H
11	IRQ3/IRL3/ PTH[3]	I	External interrupt request/input port H
12	IRQ4/PTH[4]	I	External interrupt request/input port H
13	D31/PTB[7]	I/O	Data bus/I/O port B
14	D30/PTB[6]	I/O	Data bus/I/O port B
15	D29/PTB[5]	I/O	Data bus/I/O port B
16	D28/PTB[4]	I/O	Data bus/I/O port B
17	D27/PTB[3]	I/O	Data bus/I/O port B
18	D26/PTB[2]	I/O	Data bus/I/O port B
19	VssQ	-	Power for I/O (0V)
20	D25/PTB[1]	I/O	Data bus/I/O port B
21	VssQ	-	Power for I/O (3.3V)
22	D24/PTB[0]	I/O	Data bus/I/O port B
23	D23/PTA[7]	I/O	Data bus/I/O port A
24	D22/PTA[6]	I/O	Data bus/I/O port A
25	D21/PTA[5]	I/O	Data bus/I/O port A
26	D20/PTA[4]	I/O	Data bus/I/O port A
27	Vss	-	Power supply (0V)
-	Vss	-	Power supply (0V)
28	D19/PTA[3]	I/O	Data bus/I/O port A
29	Vcc	-	Power supply (*3)
-	Vcc	-	Power supply (*3)
30	D18/PTA[2]	I/O	Data bus/I/O port A
31	D17/PTA[1]	I/O	Data bus/I/O port A
32	D16/PTA[0]	I/O	Data bus/I/O port A
33	VssQ	-	Power for I/O (0V)
34	D15	I/O	Data bus
35	VccQ	-	Power for I/O (3.3V)
36	D14	I/O	Data bus

36	**D14**	**I/O**	**Data bus**

Pin No.	Pin Name	I/O	Description
37	D13	I/O	Data bus
38	D12	I/O	Data bus
39	D11	I/O	Data bus
40	D10	I/O	Data bus
41	D9	I/O	Data bus
42	D8	I/O	Data bus
43	D7	I/O	Data bus
44	D6	I/O	Data bus
45	VssQ	-	Power for I/O (0V)
46	D5	I/O	Data bus
47	VccQ	-	Power for I/O (3.3V)
48	D4	I/O	Data bus
49	D3	I/O	Data bus
50	D2	I/O	Data bus
51	D1	I/O	Data bus
52	D0	I/O	Data bus
53	A0	O	Address bus
54	A1	O	Address bus
55	A2	O	Address bus
56	A3	O	Address bus
57	VssQ	-	Power for I/O (0V)
58	A4	O	Address bus
59	VssQ	-	Power for I/O (3.3V)
60	A5	O	Address bus
61	A6	O	Address bus
62	A7	O	Address bus
63	A8	O	Address bus
64	A9	O	Address bus
65	A10	O	Address bus
66	A11	O	Address bus
67	A12	O	Address bus
68	A13	O	Address bus
69	VssQ	-	Power for I/O (0V)
70	A14	O	Address bus
71	VccQ	-	Power for I/O (3.3V)
72	A15	O	Address bus
73	A16	O	Address bus
74	A17	O	Address bus
75	A18	O	Address bus
76	A19	O	Address bus
77	A20	O	Address bus

Pin No.	Pin Name	I/O	Description
78	A21	O	Address bus
79	Vss	-	Power supply (0V)
-	Vss	O	Power supply (0V)
80	A22	O	Address bus
81	Vss	-	Power supply (*3)
-	Vss	-	Power supply (*3)
82	A23	O	Address bus
83	VssQ	-	Power for I/O (0V)
84	A24	O	Address bus
85	VssQ	-	Power for I/O (3.3V)
86	A25	O	Address bus
87	BS/PTK[4]	O/I/O	Bus cycle start signal/I/O port K
88	RD	O	Read stroke
89	WE0/DQMLL	O	D7-D0 select signal/DOM (SDRAM)
90	WE1/DQMLU/WE	O	D15-D8 select signal/DOM (SDRAM)
91	WE2/DQMUL/ ICIORD/PTK[6]	O/I/O	D23-D16 select signal/DOM (SDRAM) /PCMCIA I/O read/I/O port K
92	WE3/DQMUU/ ICIOWR/PTK[7]	O/I/O	D31-D24 select signal/DOM (SDRAM) /PCMCIA I/O write/I/O port K
93	RD/WR	O	Read/Write
94	AUDSYNC/ PTE[7]	O/I/O	AUD synchronization/I/O port E
95	VssQ	-	Power for I/O (0V)
96	CS0/MCS[0]	O	Chip select 0/mask ROM chip select 0
97	VccQ	-	Power for I/O (3.3V)
98	CS2/PTK[0]	O/I/O	Chip select 2/I/O port K
99	CS3/PTK[1]	O/I/O	Chip select 3/I/O port K
100	CS4/PTK[2]	O/I/O	Chip select 4/I/O port K
101	CS5/PTK[3]	O/I/O	Chip select 5/CE1 (Area 5PCMCIA)/I/O port K
102	CS6/CE1B	O	Chip select 6/CE1 (Area 6PCMCIA)
103	CE2A/PTE[4]	O/I/O	CE2(Area 5PCMCIA)/ I/O port K
104	CE2B/PTE[5]	O/I/O	CE2(Area 6PCMCIA)/ I/O port K
105	CKE/PTK[5]	O/I/O	CK Enable (SDRAM) / I/O port K
106	RAS3L/PTJ[0]	O/I/O	RAS for low 32M/64M bytes address (SDRAM) /I/O port J
107	PTJ[1]	I/O	I/O port J
108	CASL/PTJ[2]	O/I/O	RAS for low 32M/64M bytes address (SDRAM) /I/O port J
109	VssQ	-	Power for I/O (0V)
110	CASU/PTJ[3]	O/I/O	RAS for low 32M bytes address (SDRAM) /I/O port J
111	VssQ	-	Power for I/O (3.3V)
112	PTJ[4]	I/O	I/O port J
113	PTJ[5]	I/O	I/O port J

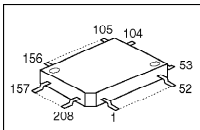
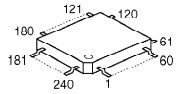
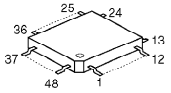
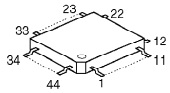
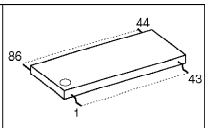
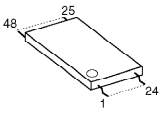
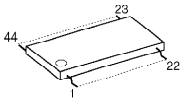
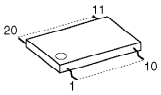
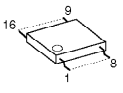
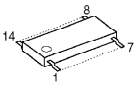
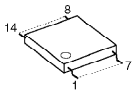
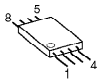
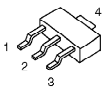
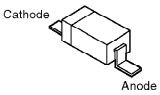
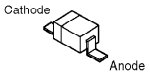
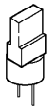
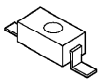
Pin No.	Pin Name	I/O	Description
114	DACK0/PTD[5]	O/I/O	DMA acknowledge0/I/O port D
115	DACK1/PTD[7]	O/I/O	DMA acknowledge1/I/O port D
116	PTE[6}	I/O	I/O port E
117	PTE[3}	I/O	I/O port E
118	RAS3U/PTE[2]	O/I/O	RAS for low 32M bytes address (SDRAM) / I/O port E
119	PTE[1]	I/O	I/O port E
120	TDO/PTE[0]	O/I/O	Test data output/I/O port E
121	BACK	O	Bus acknowledge
122	BREQ	I	Bus request
123	WAIT	I	Hardware wait request
124	RESETM	I	Manual reset request
125	ADTRG/PTH[2]	I	Analog trigger/input port H
126	IOIS16/PTG[7]	I	IOIS168 (PCMCI) / I/O port G
127	ASEMD0/PTG[6]	I	ASE mode:4/I/O port G
128	ASEBRKAK/ PTG[5]	I/O	ASE break acknowledge/I/O port G
129	PTG[4]/CKIO2	I/O	Input port G/clock output
130	AUDATA[3]/ PTG[3]	I/O/I	AUD data/input port G
131	AUDATA[2]/ PTG[2]	I/O/I	AUD data/input port G
132	Vss	-	Power supply (0V)
-	Vss	-	Power supply (0V)
133	AUDATA[1]/ PTG[1]	I/O/I	AUD data/input port G
134	Vcc	-	Power supply (*3)
-	Vcc	-	Power supply (*3)
135	AUDATA[0]/ PTG[0]	I/O/I	AUD data/input port G
136	TRST/PTF[7]/ PINT[15]	I	Test reset/input port F/port interruption
137	TMS/PTF[6]/ PINT[14]	I	Test mode switch/input port F/port interruption
138	TDI/PTF[5]/ PINT[13]	I	Test mode switch/input port F/port interruption
139	TCK/PTF[4]/ PINT[12]	I	Test clock/input port F/port interruption
140	IRS3/PTF[3]/ PINT[11]	I	External interrupt request/input port F/port interruption
141	IRS2/PTF[2]/ PINT[10]	I	External interrupt request/input port F/port interruption
142	IRS1/PTF[1]/ PINT[9]	I	External interrupt request/input port F/port interruption

Pin No.	Pin Name	I/O	Description
143	IRS0/PTF[0]/ PINT[8]	I	External interrupt request/input port F/port interruption
144	MD0	I	Clock mode setting
145	Vcc-PLL1*2	-	Power for PLL1 (*3)
146	CAP1	-	External capacity terminal for PLL1
147	Vss-PLL1*2	-	Power for PLL1 (0V)
148	Vss-PLL2*2	-	Power for PLL1 (1V)
149	CAP2	-	External capacity terminal for PLL2
150	Vcc-PLL2*2	-	Power for PLL2 (*3)
151	AUDCK/PTH[6]	I	AUD clock/input port H
152	Vss	-	Power supply (0V)
153	Vss	-	Power supply (0V)
-	Vss	-	Power supply (0V)
154	Vcc	-	Power supply (*3)
-	Vcc	-	Power supply (*3)
155	XTAL	O	Clock oscillator terminal
156	EXTAL	I	External clock/crystal oscillator terminal
157	STATUS0/PTJ[6]	O/I/O	Processor status
158	STATUS0/PTJ[7]	O/I/O	Processor status
159	TCLK/PTH[7]	I/O	Clock I/O for TMU or RTC/I/O port J
160	IRQOUT	O	Interrupt request notification
161	VssQ	-	Power for I/O (0V)
162	CKIO	I/O	System clock I/O
163	VccQ	-	Power for I/O (3.3V)
164	TxD0/SCPT[0]	O	Transmission data 0/output port for SCI
165	SCK0/SCPT[1]	I/O	Serial clock 0/output port for SCI
166	TxD1/SCPT[2]	O	Transmission data 1/output port for SCI
167	SCK1/SCPT[3]	I/O	Serial clock 1/output port for SCI
168	TxD2/SCPT[4]	O	Transmission data 2/output port for SCI
169	SCK2/SCPT[5]	I/O	Serial clock 2/output port for SCI
170	RTS0/SCPT[6]	O/I/O	
171	RxD0/SCPT[0]	I	Transmission data 0/input port for SCI
172	RxD1/SCPT[2]	I	Transmission data 1/input port for SCI
173	Vss	-	Power supply (0V)
-	Vss	-	Power supply (0V)
174	RxD2/SCPT[4]	I	Transmission data 2/input port for SCI
175	Vcc	-	Power supply (*3)
-	Vcc	-	Power supply (*3)
176	CTS2/IRQ5/ SCPT[7]	I	Transmission clear 2/external interrupt request /I/O port for SCI

Pin No.	Pin Name	I/O	Description
177	MCS[7]/PTC[7]/ PINT[7]	O/I/O	Mask ROM chip select/I/O port C/port interruption
178	MCS[6]/PTC[6]/ PINT[6]	O/I/O	Mask ROM chip select/I/O port C/port interruption
179	MCS[5]/PTC[5]/ PINT[5]	O/I/O	Mask ROM chip select/I/O port C/port interruption
180	MCS[4]/PTC[4]/ PINT[4]	O/I/O	Mask ROM chip select/I/O port C/port interruption
181	VssQ	-	Power for I/O (0V)
182	WAKEUP/PTD[3]	O/I/O	Interrupt request notification on standby mode/I/O port D
183	VccQ	-	Power for I/O (3.3V)
184	RESETOUT/ PTD[2]	O/I/O	Reset output/I/O port D
185	MCS[3]/PTC[3]/ PINT[3]	O/I/O/I	Mask ROM chip select/I/O port C/port interruption
186	MCS[2]/PTC[2]/ PINT[2]	O/I/O/I	Mask ROM chip select/I/O port C/port interruption
187	MCS[1]/PTC[1]/ PINT[1]	O/I/O/I	Mask ROM chip select/I/O port C/port interruption
188	MCS[0]/PTC[0]/ PINT[0]	O/I/O/I	Mask ROM chip select/I/O port C/port interruption
189	DRAK0/PTD[1]	O/I/O	DMA request accepting/I/O port D
190	DRAK1/PTD[0]	O/I/O	DMA request accepting/I/O port D
191	DREQ0/PTD[4]	I	DMA request/input port D
192	DREQ1/PTD[0]	I	DMA request/input port D
193	RESETP	I	Power on reset request
194	CA	I	Chip active (hardware standby request signal)
195	MD3	I	Bus width setting for area 0
196	MD4	I	Bus width setting for area 1
197	MD5	I	Endian setting
198	Avss	-	Power for analog (0V)
199	AN[0]/PTL[0]	I	AD converter input/input port L
200	AN[1]/PTL[1]	I	AD converter input/input port L
201	AN[2]/PTL[2]	I	AD converter input/input port L
202	AN[3]/PTL[3]	I	AD converter input/input port L
203	AN[4]/PTL[4]	I	AD converter input/input port L
204	AN[5]/PTL[5]	I	AD converter input/input port L
205	Avcc	-	Power for analog (3.3V)
206	AN[6]/DA[1]/ PTL[6]	I	AD converter input/DA converter output/input port L
207	AN[7]/DA[0]/ PTL[7]	I	AD converter input/DA converter output/input port L

Pin No.	Pin Name	I/O	Description
208	AVss	-	Power for analog (0V)

14. TERMINAL GUIDE OF ICS, TRANSISTORS AND DIODES

 C2DBYJ000009	 C1CB00001395	 MN5773	 C1CB00001415	 C3ABPJ000054
 PSWITDA100M	 C3BBKG000060	 C0JBAZ001765, C0ZBZ0000553	 C0JBAN000187	 PQVIMC1488MR, PQVIMC1489MR
 C0JBAB000407, C0JBAC000264, C0JBAA000174, C0JBAZ001704, C0JBAB000504	C1CB00001497, PQVINJM4558M, PSVISV7560, PQVINJM2903M	 C0DBEDA00002	C0EBE0000176, C0JBAB000381, PQVIS8520F33 C0CBAAG00006, C0CBADC00009	C0CBAAB00022
B1GBCFEH0003, UN5213, 2SC4081R, B1ABEC000005	 2SD1664Q, 2SB1132R, B1DFDC000002, B1DHCD000018	B1GHCFJJ0007	 PFVDDGD1FP3T	 MA110, MA8051, MA8043M, MA8100M MA1070400L, MA728
 LN316GP, LN216RP	 PSVD1VGCT, PSVD1SRCT	MA143		

15. HOW TO REPLACE A FLAT PACKAGE IC

15.1. PREPARATION

- PbF (: Pb free) Solder

- Soldering Iron

Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.

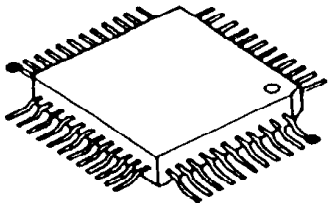
- Flux

Recommended Flux: Specific Gravity →0.82.
Type →RMA (lower residue, non-cleaning type)

Note: See ABOUT LEAD FREE SOLDER (PbF: Pb free) ().

15.2. PROCEDURE

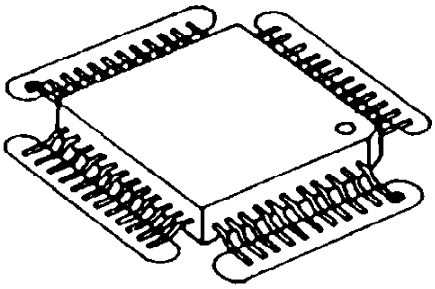
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



●– – – – – –Temporary soldering point.

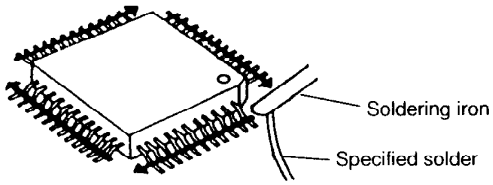
Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.



– – – – – – Flux

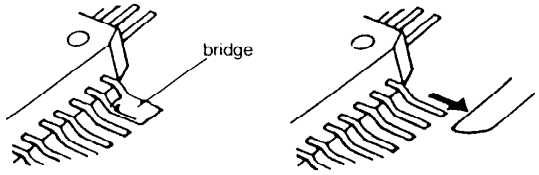
3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.



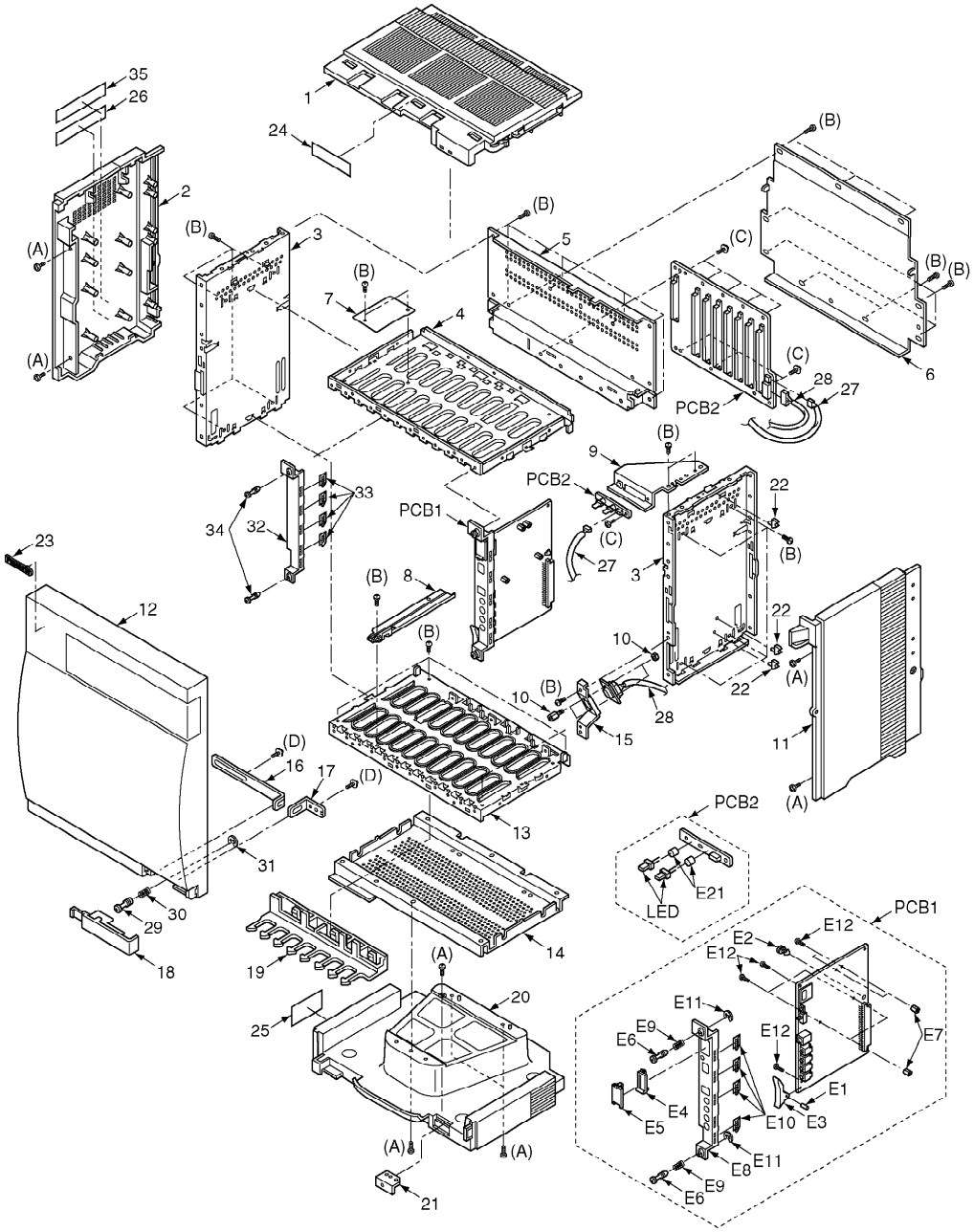
15.3. REMOVING SOLDER FROM BETWEEN PINS

1. Add a small amount of solder to the bridged pins.

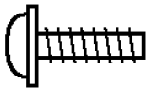
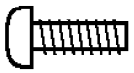
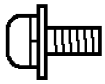
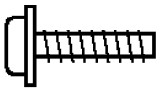
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



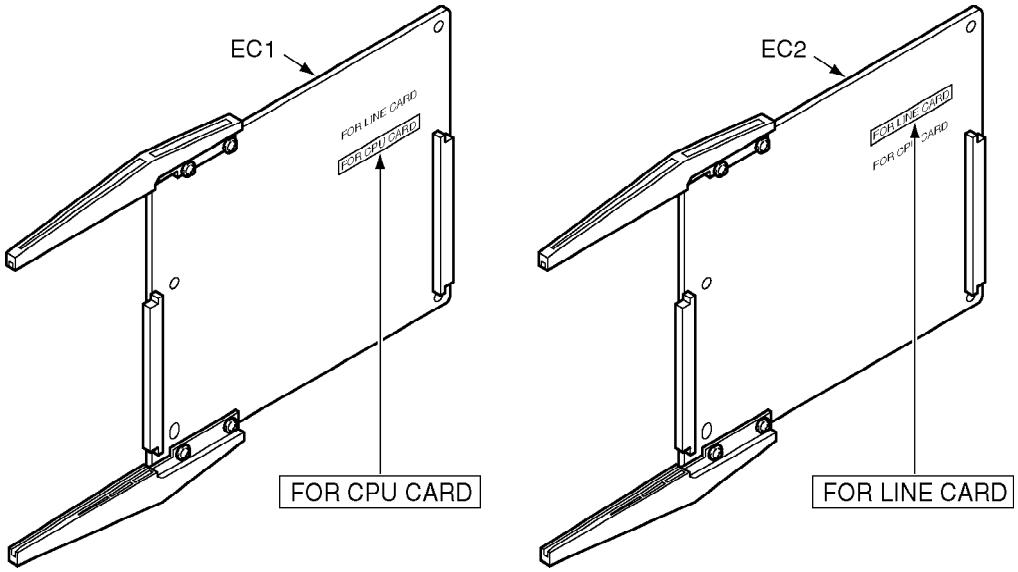
16. CABINET AND ELECTRICAL PARTS LOCATION



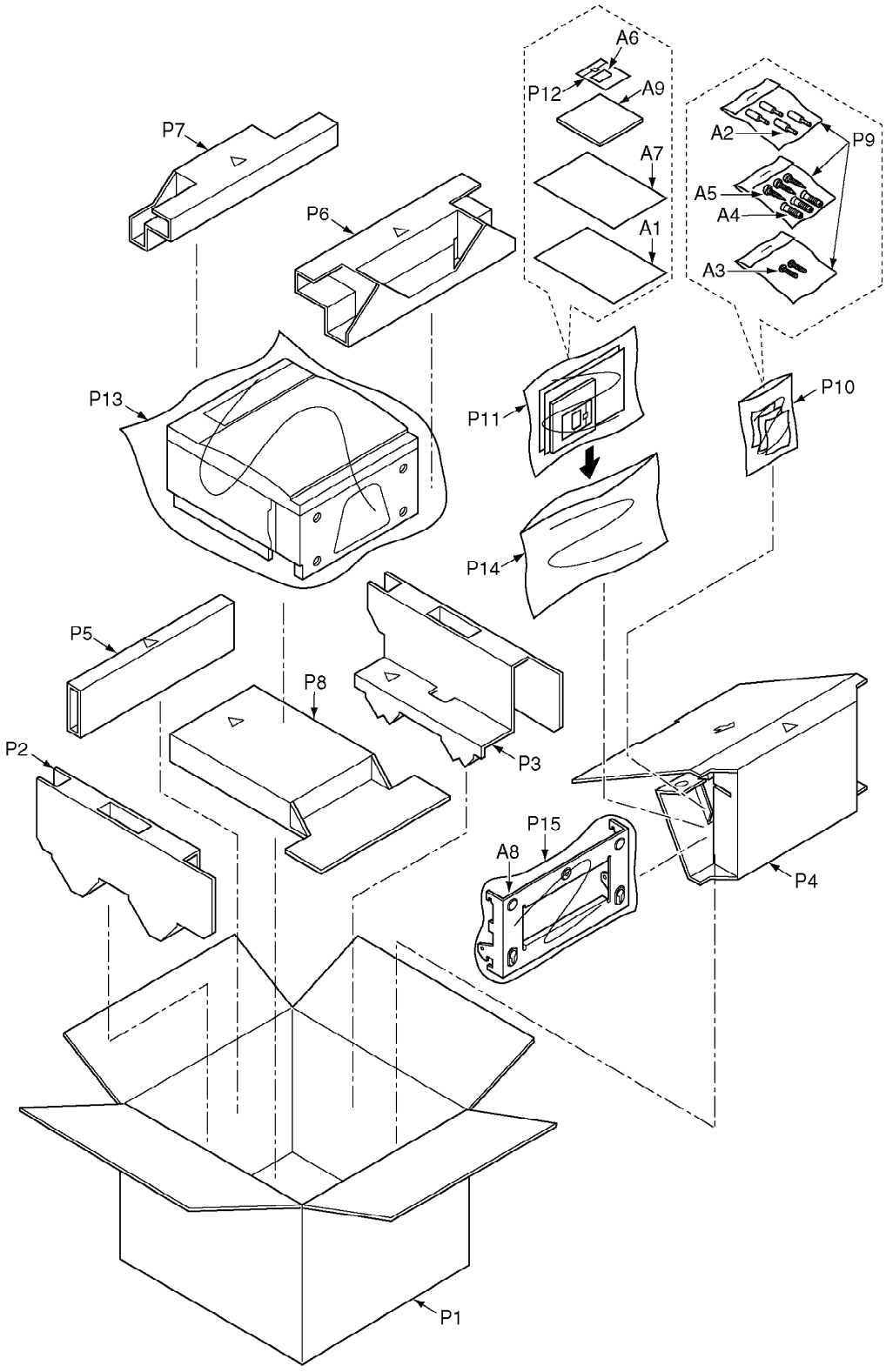
SCREWS

Ref No.	Figure	Parts No.
(A)	 Φ3x8mm	XTW3+8LFZ
(B)	 Φ3x6mm	XTV3+6F
(C)	 Φ3x6mm	XYN3+F6
(D)	 Φ3x10mm	XTW3+W10P

16.1. EXTENSION BOARDS FOR SERVICING



17. ACCESSORIES AND PACKING MATERIALS



18. REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item.
After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.

2. **Important safety notice**
   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.
3. **The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.**
4. **ISO code (Example : ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.**
5. **RESISTORS & CAPACITORS**
   Unless otherwise specified;
   All resistors are in ohms (Ω), k=1000 Ω , M=1000k Ω
   All capacitors are in MICRO FARADS (μ F), p= μ (μ F)
   ***Type & Wattage of Resistor**

Type

ERC:Solid ERD:Carbon PQRD:Carbon	ERX,ERG,ER0,ERJ :Metal Film Oxide	PQ4R:Carbon ERS:Fusible Resistor ERF:Cement Resistor

Wattege

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol PQCUV,ECUV:Chip ECQMS:Mica	ECCD,ECKD,ECBT,PQCBC:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECSZ,F2G,PSCSZ:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :63V 2A :100V

18.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PSKV1023Z1	COVER, TOP	PC+ABS-5V
2	PSKV1017Z1	COVER, LEFT SIDE	ABS-HB
3	PSMD1035Z	FRAME, SIDE	
4	PSMD1040Y	FRAME, BASE	
5	PSMH1232Z	FRAME,BACK BOARD	
6	PSMD1041Z	COVER, BACK	
7	PSMH1264Z	COVER, HOLD	
8	PSHR1235Z	GUIDE RAIL	PC+ABS-5V
9	PSMH1205Z	CHASSIS, LED	
10	PSHD1091Z	BOLT WITH NUT	
11	PSKV1016Z1	COVER, RIGHT SIDE	ABS-HB
12	PSYCTDA100AL	COVER, FRONT	PC+ABS-5V
13	PSMD1040Y	FRAME, LOWER	
14	PSMH1230Z	FRAME	
15	PSMH1222Z	ANGLE, RS-232C	
16	PSMH1206Y	ANGLE	
17	PSMH1207Z	ANGLE	
18	PSKK1035Z1	LID	PC+ABS-5V
19	PSKR1001Y1	GUIDE, CABLE	PC+ABS-5V
20	PSKL1016Z1	STAND	ABS-HB
21	PSMH1234Z	ANGLE, FRONT	
22	PQHR10379Z	CLAMPER	
23	PSGB1001Z	BADGE	PS-HB
24	PSQT1431Z	LABEL, WARNING	
25	PSYETDA100M	NAME PLATE	
26	PSQT1990Z	LABEL, CAUTION	
27	PSJS03P16Z	CONNECTOR, LED	
28	PSJS09P12Z	CONNECTOR, RS-232C	
29	PQHD10011V	SCREW	
30	PSUS1022Z	SPRING	
31	XUC3VW	RETAINING RING	
32	PSMH1244Z	CHASSIS, FRONT	
33	PSUS1021Y	SPRING	
34	PSHD1088Z	SCREW	
35	PSQT1993Z	LABEL, FCC	

18.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PSQX2788Z	REGISTRATION CARD	
A2	PQJP1E1Z	PLUG	
A3	XYN4+J18FZ	SCREW	
A4	PQHE17Z	MOUNTING BRACKET	
A5	XTB5+20AFY	SCREW	
A6	PSZETDA100M	ACCESSORY PARTS,SD CARD	
A7	PSQW2013Z	LEAFLET, SAFETY INFORMATI	
A8	PSMD1042Z	MOUNTING BRACKET	
A9	PSQX2269ZCD	CR-ROM, INSTALLATION MANUAL	
P1	PSZKTDA100M	PACKING CASE	
P2	PSPD1172Z	CUSHION	
P3	PSPD1173Z	CUSHION	
P4	PSPN1137Y	ACCESSORY BOX	
P5	PSPD1182Z	CUSHION	
P6	PSPD1171Y	CUSHION	
P7	PSPD1170Y	CUSHION	
P8	PSPD1183Z	CUSHION	
P9	XZB05X08A03	PROTECTION COVER (FOR SCREW)	
P10	XZB10X15A04	PROTECTION COVER	
P11	XZB18X27A04	PROTECTION COVER (FOR CD-ROM)	
P12	PSPP1070Z	PROTECTION COVER (FOR SD CARD)	
P13	PQPP143Z	PROTECTION COVER (FOR SET)	
P14	PSPP1069Z	PROTECTION COVER	
P15	XZB50X30A06	PROTECTION COVER (FOR MOUNTING BRACKET)	

18.3. MPR CARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PSWP1DA100M	MPR CARD ASS'Y (RTL)	
		(ICS)	
IC101	C2DBYJ000009	IC	
IC102	C1CB00001395	IC	
IC103	C1CB00001497	IC	
IC107	C0EBE0000176	IC	
IC110	C0JBAB000407	IC	S
IC111	C0JBAB000407	IC	S
IC120	PQVIMC1488MR	IC	
IC121	PQVIMC1489MR	IC	
IC123	C0JBAZ001765	IC	
IC124	C0JBAZ001765	IC	
IC125	C0JBAC000264	IC	
IC126	C0JBAA000174	IC	
IC127	C0JBAZ001704	IC	S
IC131	C0JBAB000407	IC	S
IC132	C0JBAB000381	IC	
IC201	C0JBAN000187	IC	S
IC204	C1CB00001415	IC	
IC205	MN5773	IC	
IC207	C0JBAZ001765	IC	

Ref. No.	Part No.	Part Name & Description	Remarks
IC208	C0JBAZ001765	IC	
IC209	C0JBAB000504	IC	
IC301	C3BBKG000060	IC	S
IC302	C3BBKG000060	IC	S
IC303	PSWITDA100M	IC(ROM)	
IC305	C3ABPJ000054	IC	S
IC306	C3ABPJ000054	IC	S
IC309	C0JBAN000187	IC	
IC310	C0JBAN000187	IC	
IC311	C0JBAA000174	IC	
IC402	PQVIS8520F33	IC	
IC403	C0CBAAG00006	IC	
IC404	C0CBAAB00022	IC	
IC405	C0ZBZ0000553	IC	
IC406	C0ZBZ0000553	IC	
IC408	PQVINJM4558M	IC	
IC409	PQVINJM4558M	IC	
IC410	PSVISV7560	IC	
IC411	PQVINJM2903M	IC	
IC412	C0CBADC00009	IC	
IC413	C0DBEDA00002	IC	
		(TRANSISTORS)	
Q101	B1GBCFEH0003	TRANSISTOR(SI)	
Q403	2SD1664Q	TRANSISTOR(SI)	
Q404	2SB1132R	TRANSISTOR(SI)	
Q405	2SB1132R	TRANSISTOR(SI)	
Q406	UN5213	TRANSISTOR(SI)	
Q407	2SC4081R	TRANSISTOR(SI)	
Q408	2SC4081R	TRANSISTOR(SI)	
Q409	B1ABEC000005	TRANSISTOR(SI)	
Q410	B1ABEC000005	TRANSISTOR(SI)	
Q411	B1DFDC000002	TRANSISTOR(SI)	
Q412	B1DHCD000018	TRANSISTOR(SI)	
QA101	B1GHCFJJ0007	TRANSISTOR(SI)	S
QA103	B1GHCFJJ0007	TRANSISTOR(SI)	S
		(DIODES)	
D102	MA110	DIODE(SI)	
D402	PFVDDGD1FP3T	DIODE(SI)	
D403	MA8100M	DIODE(SI)	
D405	MA8051	DIODE(SI)	
D406	MA8043M	DIODE(SI)	
D407	MA1070400L	DIODE(SI)	
D408	MA728	DIODE(SI)	
D409	MA728	DIODE(SI)	
DA401	MA143	DIODE(SI)	
DA402	MA143	DIODE(SI)	
LED101	PSVD1VGCT	LED	

Ref. No.	Part No.	Part Name & Description	Remarks
LED103	PSVD1SRCT	LED	
		(CONNECTORS)	
CN103	K1KA90B00008	CONNECTOR, 90P	
CN205	K1KAC0A00037	CONNECTOR, 120P	
CN206	K1KB30A00117	CONNECTOR, 30P	
CN207	PSJP07A44Z	CONNECTOR, 7P	
CN209	K1KB04B00036	CONNECTOR, 4P	S
CN211	K1NA09E00022	CONNECTOR, 9P	
		(JACKS)	
JK401	PSJJ1D001Z	JACK	S
JK402	PSJJ1D001Z	JACK	S
JK403	PSJJ1D001Z	JACK	S
JK404	PSJJ1D001Z	JACK	S
		(COMPONENTS PARTS)	
RA101	D1HA1038A005	RESISTOR ARRAY	
RA102	D1H8R0040009	RESISTOR ARRAY	
RA103	D1H8R0040009	RESISTOR ARRAY	
RA104	D1H8R0040009	RESISTOR ARRAY	
RA105	D1H8R0040009	RESISTOR ARRAY	
RA106	D1H8R0040009	RESISTOR ARRAY	
RA107	D1H8R0040009	RESISTOR ARRAY	
RA108	D1H8R0040009	RESISTOR ARRAY	
RA109	D1H8R0040009	RESISTOR ARRAY	
RA111	EXB38VR000	RESISTOR ARRAY	
RA112	EXB38VR000	RESISTOR ARRAY	
RA113	EXB38VR000	RESISTOR ARRAY	
RA114	EXB38VR000	RESISTOR ARRAY	
RA115	EXB38VR000	RESISTOR ARRAY	
RA116	EXB38VR000	RESISTOR ARRAY	
RA117	D1HA1038A005	RESISTOR ARRAY	
RA118	D1HA1038A005	RESISTOR ARRAY	
RA119	D1HA1038A005	RESISTOR ARRAY	
RA120	D1HA1038A005	RESISTOR ARRAY	
RA121	D1HA1038A005	RESISTOR ARRAY	
RA122	D1HA1038A005	RESISTOR ARRAY	
RA123	EXB38V680JV	RESISTOR ARRAY	
RA124	EXB38V680JV	RESISTOR ARRAY	
RA125	EXB38V680JV	RESISTOR ARRAY	
RA126	EXB38V680JV	RESISTOR ARRAY	
RA127	EXB38V680JV	RESISTOR ARRAY	
RA128	EXRV8V470JV	RESISTOR ARRAY	
RA129	EXRV8V470JV	RESISTOR ARRAY	
RA133	D1HA1038A005	RESISTOR ARRAY	
RA134	D1HA1038A005	RESISTOR ARRAY	
RA135	D1HA1038A005	RESISTOR ARRAY	
RA136	EXB38V222JV	RESISTOR ARRAY	
RA137	EXB38V103JV	RESISTOR ARRAY	

Ref. No.	Part No.	Part Name & Description	Remarks
RA201	D1HA1048A005	RESISTOR ARRAY	S
RA202	EXB38V220JV	RESISTOR ARRAY	
RA203	EXB38V220JV	RESISTOR ARRAY	
RA204	D1H82204A024	RESISTOR ARRAY	
RA205	D1H82204A024	RESISTOR ARRAY	
RA206	D1H82204A024	RESISTOR ARRAY	
RA207	D1H82204A024	RESISTOR ARRAY	
RA301	D1HA1038A005	RESISTOR ARRAY	
RA302	D1HA1038A005	RESISTOR ARRAY	
RA303	D1HA1038A005	RESISTOR ARRAY	
RA304	D1HA1038A005	RESISTOR ARRAY	
RA305	D1HA1038A005	RESISTOR ARRAY	
RA306	D1HA1038A005	RESISTOR ARRAY	
RA307	D1HA1038A005	RESISTOR ARRAY	
RA308	D1HA1038A005	RESISTOR ARRAY	
RA309	D1HA1038A005	RESISTOR ARRAY	
		(CAPACITORS)	
C101	PQCUV1A225ZF	2.2	
C102	ECUV1A105ZFV	1	
C103	ECUV1C104ZFV	0.1	
C104	ECUV1C104ZFV	0.1	
C105	ECUV1C104ZFV	0.1	
C106	ECUV1C104ZFV	0.1	
C107	ECUV1C104ZFV	0.1	
C108	ECUV1C104ZFV	0.1	
C109	ECUV1H120JCV	12p	
C110	ECUV1C104ZFV	0.1	
C111	ECUV1C104ZFV	0.1	
C112	ECUV1C104ZFV	0.1	
C114	ECUV1H120JCV	12p	
C116	ECUV1C104ZFV	0.1	
C117	ECUV1C104ZFV	0.1	
C118	ECUV1C104ZFV	0.1	
C119	ECUV1C104ZFV	0.1	
C120	ECUV1C104ZFV	0.1	
C121	ECUV1A105ZFV	1	
C122	ECUV1A105ZFV	1	
C123	ECUV1A105ZFV	1	
C124	ECUV1C104ZFV	0.1	
C125	ECUV1C104ZFV	0.1	
C126	PQCUV1A225ZF	2.2	
C127	PQCUV1A225ZF	2.2	
C128	PQCUV1A225ZF	2.2	
C129	ECUV1A105ZFV	1	
C130	ECUV1A105ZFV	1	
C131	PQCUV1A225ZF	2.2	
C132	PQCUV1A225ZF	2.2	
C133	PQCUV1A225ZF	2.2	
C134	PQCUV1A225ZF	2.2	

Ref. No.	Part No.	Part Name & Description	Remarks
C135	ECUV1H220JCV	22p	
C136	ECUV1H220JCV	22p	
C137	ECUV1H471JCV	470p	
C138	ECUV1H471JCV	470p	
C139	ECUV1C104ZFV	0.1	
C140	ECUV1A105ZFV	1	
C141	ECUV1C104ZFV	0.1	
C142	ECUV1C104ZFV	0.1	
C143	PQCUV1A225ZF	2.2	
C144	ECUV1C104ZFV	0.1	
C145	ECUV1C104ZFV	0.1	
C146	ECUV1C104ZFV	0.1	
C147	ECUV1C104ZFV	0.1	
C148	ECUV1C104ZFV	0.1	
C149	ECUV1C104ZFV	0.1	
C150	ECUV1A105ZFV	1	
C151	PQCUV1A225ZF	2.2	
C156	ECUV1H102KBV	0.001	
C157	ECUV1H102KBV	0.001	
C159	ECUV1C104ZFV	0.1	
C160	ECUV1A105ZFV	1	
C161	ECUV1C104ZFV	0.1	
C162	ECUV1C104ZFV	0.1	
C163	ECUV1C104ZFV	0.1	
C166	ECUV1C104ZFV	0.1	
C167	ECUV1C104ZFV	0.1	
C168	ECUV1H102KBV	0.001	
C170	ECUV1C104ZFV	0.1	
C174	ECUV1C104ZFV	0.1	
C201	ECUV1H220JCV	22p	
C202	PQCUV1A225ZF	2.2	
C203	ECUV1H220JCV	22p	
C204	ECUV1A105ZFV	1	
C205	ECUV1C104ZFV	0.1	
C206	ECUV1C104ZFV	0.1	
C207	ECUV1C104ZFV	0.1	
C208	ECUV1C104ZFV	0.1	
C209	PQCUV1A225ZF	2.2	
C210	ECUV1A105ZFV	1	
C211	ECUV1C104ZFV	0.1	
C212	ECUV1C105ZFV	1	
C214	ECUV1C104ZFV	0.1	
C215	ECUV1C104ZFV	0.1	
C216	ECUV1C104ZFV	0.1	
C217	ECUV1H150JCV	15p	
C218	ECUV1H150JCV	15p	
C219	ECUV1C104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C220	ECUV1A105ZFV	1	
C301	PQCUV1A225ZF	2.2	
C302	PQCUV1A225ZF	2.2	
C303	ECUV1A105ZFV	1	
C304	ECUV1A105ZFV	1	
C305	ECUV1C104ZFV	0.1	
C306	ECUV1C104ZFV	0.1	
C307	ECUV1H102KBV	0.001	
C308	ECUV1C104ZFV	0.1	
C310	ECUV1A105ZFV	1	
C312	PQCUV1A225ZF	2.2	
C314	ECUV1C104ZFV	0.1	
C315	ECUV1A105ZFV	1	
C316	PQCUV1A225ZF	2.2	
C317	ECUV1C104ZFV	0.1	
C318	ECUV1A105ZFV	1	
C319	PQCUV1A225ZF	2.2	
C320	ECUV1C104ZFV	0.1	
C321	ECUV1C104ZFV	0.1	
C322	ECUV1C104ZFV	0.1	
C402	F2G1E3310005	330	
C403	ECUV1C104ZFV	0.1	
C404	ECUV1C104ZFV	0.1	
C406	ECUV1C104ZFV	0.1	
C408	F2G0J4710006	470	
C410	ECUV1C104ZFV	0.1	
C411	ECUV1C104ZFV	0.1	
C412	ECUV1C104ZFV	0.1	
C413	ECUV1H103KBV	0.01	
C414	ECUV1C104ZFV	0.1	
C415	ECUV1H103KBV	0.01	
C416	PQCUV1A225ZF	2.2	
C417	PSCSZ1AX106M	10	
C418	ECUV1A105ZFV	1	
C419	ECUV1H121JCV	120p	
C420	ECUV1A105ZFV	1	
C421	ECUV1H121JCV	120p	
C422	ECUV1C104ZFV	0.1	
C423	ECUV1C104ZFV	0.1	
C424	ECUV1C104ZFV	0.1	
C425	ECUV1C104ZFV	0.1	
C426	ECUV1C104ZFV	0.1	
C427	ECUV1C104ZFV	0.1	
C428	ECUV1C104ZFV	0.1	
C429	ECUV1C104ZFV	0.1	
C430	ECUV1H153KBV	0.015	
C431	ECUV1H153KBV	0.015	

Ref. No.	Part No.	Part Name & Description	Remarks
C433	ECUV1C104ZFV	0.1	
C435	ECUV1A105ZFV	1	
C436	ECUV1A105ZFV	1	
C437	ECUV1H333KBV	0.033	
C438	ECUV1H333KBV	0.033	
C439	ECUV1H102KBV	0.001	
C440	ECUV1H102KBV	0.001	
C441	ECUV1H332KBV	0.0033	
C442	ECUV1H105ZF	1	
C443	ECUV1H105ZF	1	
C444	ECUV1H332KBV	0.0033	
C445	ECUV1H105ZF	1	
C446	ECUV1H105ZF	1	
C447	ECUV1H105ZF	1	
C448	ECUV1H105ZF	1	
C449	ECUV1H105ZF	1	
C450	ECUV1H105ZF	1	
C451	PQCUV1C105ZF	1	
C452	PQCUV1C105ZF	1	
C453	F2G1H1000010	10	
C454	F2G1H1000010	10	
C455	ERJ3GEY0R00	0(RESISTOR)	
C465	ECUV1C104ZFV	0.1	
C466	ECUV1C104ZFV	0.1	
C467	ECUV1H102KBV	0.001	
C468	ECUV1H102KBV	0.001	
C469	ECUV1H102KBV	0.001	
C470	ECUV1H102KBV	0.001	
		(RESISTORS)	
R103	ERJ3GEYJ332	3.3k	
R104	ERJ3GEY0R00	0	
R105	ERJ3GEYJ471	470	
R106	ERJ3GEY0R00	0	
R107	ERJ3GEY0R00	0	
R108	ERJ3GEY0R00	0	
R109	ERJ3GEY0R00	0	
R110	ERJ3GEY0R00	0	
R111	ERJ3GEY0R00	0	
R112	ERJ3GEY0R00	0	
R113	ERJ3GEY0R00	0	
R114	ERJ3GEY0R00	0	
R117	ERJ3GEY0R00	0	
R118	ERJ3GEY0R00	0	
R119	ERJ3GEYJ220	22	
R120	ERJ3GEY0R00	0	
R121	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R122	ERJ3GEY0R00	0	
R123	ERJ3GEY0R00	0	
R124	ERJ3GEY0R00	0	
R125	ERJ3GEY0R00	0	
R126	ERJ3GEYJ103	10k	
R127	ERJ3GEYJ103	10k	
R128	ERJ3GEYJ102	1k	
R129	ERJ3GEY0R00	0	
R130	ERJ3GEYJ102	1k	
R131	ERJ3GEY0R00	0	
R132	ERJ3GEYJ102	1k	
R133	ERJ3GEYJ182	1.8k	
R134	ERJ3GEYJ103	10k	
R135	ERJ3GEY0R00	0	
R136	ERJ3GEY0R00	0	
R137	ERJ3GEYJ103	10k	
R138	ERJ3GEYJ103	10k	
R139	ERJ3GEYJ103	10k	
R140	ERJ3GEYJ330	33	
R142	ERJ3GEYJ330	33	
R143	ERJ3GEYJ330	33	
R144	ERJ3GEYJ470	47	
R145	ERJ3GEYJ470	47	
R146	ERJ3GEYJ680	68	
R148	ERJ3GEYJ103	10k	
R150	ERJ3GEYJ332	3.3k	
R151	ERJ3GEYJ332	3.3k	
R152	ERJ3GEYJ332	3.3k	
R153	ERJ3GEYJ332	3.3k	
R155	ERJ3GEYJ182	1.8k	
R156	ERJ3GEYJ182	1.8k	
R157	ERJ3GEYJ182	1.8k	
R159	ERJ3GEYJ680	68	
R164	ERJ3GEYJ470	47	
R165	ERJ3GEYJ470	47	
R166	ERJ3GEYJ332	3.3k	
R167	ERJ3GEYJ332	3.3k	
R168	ERJ3GEYJ332	3.3k	
R170	ERJ3GEYJ332	3.3k	
R171	ERJ3GEYJ102	1k	
R172	ERJ3GEYJ103	10k	
R173	ERJ3GEYJ102	1k	
R174	ERJ3GEYJ102	1k	
R175	ERJ3GEYJ182	1.8k	
R176	ERJ3GEYJ681	680	
R178	ERJ3GEYJ102	1k	
R179	ERJ3GEYJ222	2.2k	
R180	ERJ3GEYJ222	2.2k	
R181	ERJ3GEYJ102	1k	

Ref. No.	Part No.	Part Name & Description	Remarks
R182	ERJ3GEYJ223	22k	
R183	ERJ3GEYJ821	820	
R184	ERJ3GEYJ821	820	
R185	ERJ3GEYJ821	820	
R186	ERJ3GEYJ821	820	
R187	ERJ3GEYJ821	820	
R188	ERJ3GEYJ821	820	
R189	ERJ3GEYJ101	100	
R190	ERJ3GEYJ101	100	
R191	ERJ3GEYJ220	22	
R192	ERJ3GEYJ220	22	
R193	ERJ3GEYJ220	22	
R194	ERJ3GEYJ220	22	
R195	ERJ3GEYJ101	100	
R196	ERJ3GEYJ101	100	
R197	ERJ3GEYJ101	100	
R198	ERJ3GEYJ472	4.7k	
R199	ERJ3GEYJ102	1k	
R203	ERJ3GEYJ330	33	
R204	ERJ3GEYJ330	33	
R205	ERJ3GEYJ330	33	
R206	ERJ3GEYJ330	33	
R207	ERJ3GEYJ105	1M	
R208	ERJ3GEYJ681	680	
R214	ERJ3GEYJ152	1.5k	
R226	ERJ3GEYJ220	22	
R227	ERJ3GEYJ220	22	
R236	ERJ3GEYJ562	5.6k	
R238	ERJ3GEYJ103	10k	
R239	ERJ3GEYJ473	47k	
R240	ERJ3GEYJ473	47k	
R241	ERJ3GEYJ473	47k	
R242	ERJ3GEYJ473	47k	
R243	ERJ3GEYJ104	100k	
R244	ERJ3GEYJ472	4.7k	
R245	ERJ3GEYJ473	47k	
R246	ERJ3GEYJ473	47k	
R247	ERJ3GEYJ102	1k	
R248	ERJ3GEYJ105	1M	
R250	ERJ3GEYJ330	33	
R251	ERJ3GEYJ104	100k	
R302	ERJ3GEYJ103	10k	
R303	ERJ3GEYJ103	10k	
R304	ERJ3GEYJ103	10k	
R305	ERJ3GEYJ103	10k	
R306	ERJ3GEYJ103	10k	
R307	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & Description	Remarks
R401	ERJ3GEYJ103	10k	
R403	ERJ3GEYJ560	56	
R406	ERJ3GEYJ102	1k	
R409	ERJ3GEY0R00	0	
R410	ERJ3GEYJ681	680	
R411	ERJ3GEYJ681	680	
R412	ERJ3GEYJ682	6.8k	
R413	ERJ3GEYJ102	1k	
R414	ERJ3GEYJ222	2.2k	
R415	ERJ3GEYJ103	10k	
R416	ERJ3GEYJ222	2.2k	
R417	ERJ3GEYJ681	680	
R418	ERJ3GEYJ222	2.2k	
R419	ERJ3GEYJ103	10k	
R420	ERJ3GEYJ103	10k	
R421	ERJ3GEYJ106	10M	
R422	ERJ3GEYJ472	4.7k	
R423	ERJ3GEYJ563	56k	
R424	ERJ3GEYJ563	56k	
R425	ERJ3GEYJ563	56k	
R426	ERJ3GEYJ563	56k	
R427	ERJ3GEYJ104	100k	
R428	ERJ3GEYJ104	100k	
R429	ERJ3GEYJ561	560	
R430	ERJ3GEYJ561	560	
R431	ERJ3GEYJ561	560	
R432	ERJ3GEYJ561	560	
R433	ERJ3GEYJ104	100k	
R434	ERJ3GEYJ473	47k	
R435	ERJ3GEYJ333	33k	
R436	ERJ3GEYJ333	33k	
R437	ERJ3GEYJ223	22k	
R438	ERJ3GEYJ223	22k	
R439	ERJ3GEYJ223	22k	
R440	ERJ3GEYJ223	22k	
R441	ERJ3GEYJ223	22k	
R442	ERJ3GEYJ103	10k	
R443	ERJ3GEYJ103	10k	
R444	ERJ3GEYJ823	82k	
R445	ERJ3GEYJ823	82k	
R446	ERJ3GEYJ103	10k	
R447	ERJ3GEYJ103	10k	
R448	ERJ3GEYJ105	1M	
R449	ERJ3GEYJ105	1M	
R450	ERJ3GEYJ823	82k	
R451	ERJ3GEYJ823	82k	
R452	ERJ3GEYJ222	2.2k	
R453	ERJ3GEYJ223	22k	
R454	ERJ3GEYJ222	2.2k	

Ref. No.	Part No.	Part Name & Description	Remarks
R455	ERJ3GEYJ223	22k	
R456	ERJ3GEYJ223	22k	
R457	ERJ3GEYJ223	22k	
R458	ERJ3GEYJ472	4.7k	
R459	ERJ3GEYJ472	4.7k	
R460	ERJ3GEYJ222	2.2k	
R461	ERJ3GEYJ222	2.2k	
R462	ERJ3GEYJ473	47k	
R463	ERJ3GEYJ473	47k	
R464	ERJ3GEY0R00	0	
R465	ERJ3GEY0R00	0	
R468	ERJ3GEYJ106	10M	
R501	ERJ3GEYJ103	10k	
R502	ERJ3GEYJ103	10k	
R503	ERJ3GEYJ681	680	
R504	ERJ3GEYJ681	680	
R505	ERJ3GEYJ103	10k	
R506	ERJ3GEYJ103	10k	
R507	ERJ3GEYJ103	10k	
R508	ERJ3GEYJ103	10k	
R509	ERJ3GEYJ103	10k	
R510	ERJ3GEYJ103	10k	
R511	ERJ3GEYJ103	10k	
R512	ERJ3GEYJ103	10k	
R513	ERJ3GEYJ103	10k	
R514	ERJ3GEYJ103	10k	
R515	ERJ3GEYJ103	10k	
R516	ERJ3GEYJ103	10k	
R517	ERJ3GEYJ103	10k	
R518	ERJ3GEYJ103	10k	
R519	ERJ3GEYJ821	820	
R520	ERJ3GEYJ102	1k	
R521	ERJ3GEYJ222	2.2k	
R522	ERJ3GEYJ102	1k	
R523	ERJ3GEY0R00	0	
R525	ERJ3GEYJ103	10k	
R526	ERJ3GEYJ103	10k	
R527	ERJ3GEYJ220	22	
R528	ERJ3GEYJ220	22	
R529	ERJ3GEYJ103	10k	
R530	ERJ3GEYJ103	10k	
R531	ERJ3GEYJ103	10k	
R532	ERJ3GEYJ103	10k	
R549	ERJ3GEYJ103	10k	
R553	ERJ3GEYJ680	68	
R554	ERJ3GEYJ103	10k	
R555	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & Description	Remarks
R556	ERJ3GEYJ103	10k	
R557	ERJ3GEYJ103	10k	
R558	ERJ3GEYJ103	10k	
R559	ERJ3GEYJ103	10k	
R562	ERJ3GEYJ103	10k	
R563	ERJ3GEYJ103	10k	
R564	ERJ3GEYJ101	100	
R565	ERJ3GEYJ101	100	
R566	ERJ3GEYJ220	22	
R567	ERJ3GEY0R00	0	
R568	ERJ3GEY0R00	0	
R569	ERJ3GEYJ103	10k	
J105	ERJ3GEYJ223	22k	
J109	ERJ3GEY0R00	0	
J110	ERJ3GEY0R00	0	
J113	PQ4R18XJ000	0	
J114	PQ4R18XJ000	0	
J115	PQ4R18XJ000	0	
J116	PQ4R18XJ000	0	
J121	ERJ3GEY0R00	0	
J123	ERJ3GEY0R00	0	
J126	ERJ3GEY0R00	0	
J129	ERJ3GEY0R00	0	
J130	ERJ3GEY0R00	0	
J131	ERJ3GEY0R00	0	
J133	ERJ3GEY0R00	0	
J155	ERJ3GEY0R00	0	
J157	ERJ3GEY0R00	0	
J162	ERJ3GEY0R00	0	
J210	ERJ3GEY0R00	0	
J211	ERJ3GEY0R00	0	
J212	ERJ3GEY0R00	0	
J213	ERJ3GEY0R00	0	
J216	ERJ3GEY0R00	0	
J301	ERJ3GEY0R00	0	
J303	ERJ3GEY0R00	0	
J305	ERJ3GEY0R00	0	
J307	ERJ3GEY0R00	0	
J309	ERJ3GEY0R00	0	
J311	ERJ3GEY0R00	0	
J315	ERJ3GEY0R00	0	
J330	ERJ3GEY0R00	0	
J331	ERJ3GEY0R00	0	
J411	ERJ3GEY0R00	0	
DIP02	ERJ3GEY0R00	0	
		(FILTERS ,COILS AND RESISTORS)	
FIL101	J0HAAH000003	CERAMIC FILTER	
FIL102	J0HAAB000020	IC FILTER	

Ref. No.	Part No.	Part Name & Description	Remarks
FIL103	J0HAAH000003	CERAMIC FILTER	
FIL104	J0HAAH000003	CERAMIC FILTER	
FIL106	J0HAAB000020	IC FILTER	
FIL107	J0HAAH000003	CERAMIC FILTER	
FIL108	J0HAAB000020	IC FILTER	
FIL109	J0HAAH000003	CERAMIC FILTER	
FIL110	J0HAAB000020	IC FILTER	
FIL111	J0HAAH000003	CERAMIC FILTER	
FIL201	J0HAAH000003	CERAMIC FILTER	
FIL207	J0HAAH000003	CERAMIC FILTER	
FIL208	J0HAAB000020	IC FILTER	
FIL209	J0HAAH000003	CERAMIC FILTER	
FIL301	J0HAAH000003	CERAMIC FILTER	
FIL302	J0HAAH000003	CERAMIC FILTER	
FIL303	J0HAAH000003	CERAMIC FILTER	
FIL305	J0HAAH000003	CERAMIC FILTER	
FIL306	J0HAAH000003	CERAMIC FILTER	
FIL401	G1BYYYC00007	COIL	
FIL402	G1BYYYC00007	COIL	
FIL403	G1BYYYC00007	COIL	
FIL404	G1BYYYC00007	COIL	
L101	J0JCC0000042	COIL	
L102	J0JCC0000042	COIL	
L103	J0JCC0000042	COIL	
L105	ERJ3GEY0R00	0	
L106	ERJ3GEY0R00	0	
L107	ERJ3GEY0R00	0	
L108	ERJ3GEY0R00	0	
L109	ERJ3GEY0R00	0	
L110	ERJ3GEY0R00	0	
L113	ERJ3GEY0R00	0	
L114	ERJ3GEY0R00	0	
L115	ERJ3GEY0R00	0	
L116	ERJ3GEY0R00	0	
L117	ERJ3GEY0R00	0	
L118	ERJ3GEY0R00	0	
L119	ERJ3GEY0R00	0	
L120	ERJ3GEY0R00	0	
L121	ERJ3GEY0R00	0	
L122	ERJ3GEY0R00	0	
L123	ERJ3GEY0R00	0	
L124	ERJ3GEY0R00	0	
L125	ERJ3GEY0R00	0	
L126	ERJ3GEY0R00	0	
L127	ERJ3GEY0R00	0	
L128	ERJ3GEY0R00	0	
L129	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
L130	ERJ3GEY0R00	0	
L131	ERJ3GEY0R00	0	
L132	ERJ3GEY0R00	0	
L133	ERJ3GEY0R00	0	
L134	ERJ3GEY0R00	0	
L135	ERJ3GEY0R00	0	
L136	ERJ3GEY0R00	0	
L137	ERJ3GEY0R00	0	
L138	ERJ3GEY0R00	0	
L139	ERJ3GEY0R00	0	
L140	ERJ3GEY0R00	0	
L141	ERJ3GEY0R00	0	
L142	ERJ3GEY0R00	0	
L143	ERJ3GEY0R00	0	
L144	ERJ3GEY0R00	0	
L145	ERJ3GEY0R00	0	
L146	ERJ3GEY0R00	0	
L147	ERJ3GEY0R00	0	
L148	PFVF1B221SB	CERAMIC FILTER	
L149	PFVF1B221SB	CERAMIC FILTER	
L150	PFVF1B221SB	CERAMIC FILTER	
L151	PFVF1B221SB	CERAMIC FILTER	
L152	PFVF1B221SB	CERAMIC FILTER	
L153	PFVF1B221SB	CERAMIC FILTER	
L154	PFVF1B221SB	CERAMIC FILTER	
L155	PFVF1B221SB	CERAMIC FILTER	
L156	PFVF1B221SB	CERAMIC FILTER	
L157	PFVF1B221SB	CERAMIC FILTER	
L158	PFVF1B221SB	CERAMIC FILTER	
L159	PFVF1B221SB	CERAMIC FILTER	
L160	PFVF1B221SB	CERAMIC FILTER	
L161	PFVF1B221SB	CERAMIC FILTER	
L162	PFVF1B221SB	CERAMIC FILTER	
L163	PFVF1B221SB	CERAMIC FILTER	
L164	PFVF1B221SB	CERAMIC FILTER	
L165	PFVF1B221SB	CERAMIC FILTER	
L166	PFVF1B221SB	CERAMIC FILTER	
L167	PFVF1B221SB	CERAMIC FILTER	
L168	PFVF1B221SB	CERAMIC FILTER	
L169	PFVF1B221SB	CERAMIC FILTER	
L170	PFVF1B221SB	CERAMIC FILTER	
L171	PFVF1B221SB	CERAMIC FILTER	
L172	PFVF1B221SB	CERAMIC FILTER	
L173	PFVF1B221SB	CERAMIC FILTER	
L174	PFVF1B221SB	CERAMIC FILTER	
L175	PFVF1B221SB	CERAMIC FILTER	
L176	PFVF1B221SB	CERAMIC FILTER	
L177	PFVF1B221SB	CERAMIC FILTER	
L183	PFVF1A471SG	CERAMIC FILTER	

Ref. No.	Part No.	Part Name & Description	Remarks
L184	PFVF1A471SG	CERAMIC FILTER	
L185	PFVF1A471SG	CERAMIC FILTER	
L186	PFVF1A471SG	CERAMIC FILTER	
L187	PFVF1A471SG	CERAMIC FILTER	
L189	PFVF1B470SB	CERAMIC FILTER	
L190	PFVF1B470SB	CERAMIC FILTER	
L191	PQ4R10XJ000	0	
L192	PQ4R10XJ000	0	
L193	PQ4R10XJ000	0	
L194	PQ4R10XJ000	0	
L195	PQ4R10XJ000	0	
L196	PQ4R10XJ000	0	
L211	ERJ3GEY0R00	0	
L212	ERJ3GEY0R00	0	
L213	ERJ3GEY0R00	0	
L214	ERJ3GEY0R00	0	
L215	ERJ3GEY0R00	0	
L216	ERJ3GEY0R00	0	
L217	ERJ3GEY0R00	0	
L218	ERJ3GEY0R00	0	
L219	ERJ3GEY0R00	0	
L220	ERJ3GEY0R00	0	
L221	ERJ3GEY0R00	0	
L222	ERJ3GEY0R00	0	
L223	ERJ3GEY0R00	0	
L224	ERJ3GEY0R00	0	
L225	ERJ3GEY0R00	0	
L226	ERJ3GEY0R00	0	
L227	PQ4R10XJ000	0	
L228	PQ4R10XJ000	0	
L229	PQ4R10XJ000	0	
L301	PQ4R10XJ000	0	
L302	PQ4R10XJ000	0	
L303	PQ4R10XJ000	0	
L305	PQ4R10XJ000	0	
L306	PQ4R10XJ000	0	
L401	G1A330G00004	COIL	
L403	J0JHC0000035	CERAMIC FILTER	
L405	PFVF1A471SG	CERAMIC FILTER	
L406	PFVF1A471SG	CERAMIC FILTER	
L407	PFVF1A471SG	CERAMIC FILTER	
L408	PFVF1A471SG	CERAMIC FILTER	
L409	PFVF1A471SG	CERAMIC FILTER	
L410	PFVF1A471SG	CERAMIC FILTER	
L411	PFVF1A471SG	CERAMIC FILTER	
L412	PFVF1A471SG	CERAMIC FILTER	
L413	PFVF2P600SG	CERAMIC FILTER	
L414	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
L415	ERJ3GEY0R00	0	
L416	ERJ3GEY0R00	0	
L417	ERJ3GEY0R00	0	
L418	ERJ3GEY0R00	0	
L419	ERJ3GEY0R00	0	
L420	ERJ3GEY0R00	0	
L421	ERJ3GEY0R00	0	
		(FUSES)	
IP401	K5H502Z00003	FUSE	
IP402	K5H252Z00003	FUSE	
		(BATTERY)	
BAT401	CR23541GUF	LITHIUM BATTERY	
		(SWITCHES)	
SW101	EVQPF106K	SWITCH	
SW103	PQSS2A26Y	SWITCH	
		(CRYSTAL OSCILLATORS)	
X101	PSVCC0025GT	CRYSTAL OSCILLATOR	
X102	PSVCC0019CT	CRYSTAL OSCILLATOR	
X103	H1B1635B0016	CRYSTAL OSCILLATOR	
X201	H0J120500019	CRYSTAL OSCILLATOR	
X202	H0J200500030	CRYSTAL OSCILLATOR	
		(OTHERS)	
E1	PQDF996Z	SHAFT	
E2	PQHR10005Z	SPACER	
E3	PQUB14Z2	LEVER	PA-V0
E4	PSGE1005Z	COVER	ABS-HB
E5	PSGE1006Z	COVER	ABS-HB
E6	PSHD1088Z	SCREW	ABS-HB
E7	PSHE1122Z	SPACER	
E8	PSMH1208Z	CHASSIS	
E9	PSUS1020Z	SPRING	
E10	PSUS1021Y	SPRING	
E11	XUC25VWV	RETAINING RING	
E12	XYN3+F6	SCREW	

18.4. BACK/LED BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PSWP2DA100AL	BACK/LED BOARD ASS'Y (RTL)	
		(DIODES)	
LED201	LN316GP	LED	
LED202	LN216RP	LED	
		(CONNECTORS)	
CN100	PSJS44A07Y	CONNECTOR, 44P	
CN102	K1KB90A00014	CONNECTOR, 90P	
CN103	K1KB90A00014	CONNECTOR, 90P	
CN104	K1KB90A00014	CONNECTOR, 90P	
CN105	K1KB90A00014	CONNECTOR, 90P	
CN106	K1KB90A00014	CONNECTOR, 90P	
CN107	K1KB90A00014	CONNECTOR, 90P	
CN112	K1KB90A00014	CONNECTOR, 90P	
CN113	K1KA09B00077	CONNECTOR, 9P	
CN114	PQJP3G38Z	CONNECTOR, 3P	
CN201	PQJP3D68Z	CONNECTOR, 3P	
		(CAPACITORS)	
C101	PQCUV1A225ZF	2.2	
C106	ECUV1C104ZFV	0.1	
C107	ECUV1C104ZFV	0.1	
C108	ECUV1C104ZFV	0.1	
C109	ECUV1C104ZFV	0.1	
C110	ECUV1C104ZFV	0.1	
C111	ECUV1C104ZFV	0.1	
C201	PQCUV1A225ZF	2.2	
C202	ECUV1C104ZFV	0.1	
C203	ECUV1C104ZFV	0.1	
C204	ECUV1C104ZFV	0.1	
C205	ECUV1C104ZFV	0.1	
C206	ECUV1C104ZFV	0.1	
C207	ECUV1C104ZFV	0.1	
		(RESISTORS)	
R101	ERJ3GEYJ103	10k	
R102	ERJ3GEYJ103	10k	
R105	ERJ3GEYJ103	10k	
R106	ERJ3GEYJ103	10k	
R107	ERJ3GEYJ103	10k	
R108	ERJ3GEYJ103	10k	
R109	ERJ3GEYJ103	10k	
R110	ERJ3GEYJ103	10k	
R147	ERJ3GEYJ103	10k	
R148	ERJ3GEYJ103	10k	
R151	ERJ3GEYJ103	10k	
R152	ERJ3GEYJ103	10k	
R153	ERJ3GEYJ103	10k	
R154	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & Description	Remarks
R155	ERJ3GEYJ103	10k	
R156	ERJ3GEYJ103	10k	
R157	ERJ3GEYJ103	10k	
R165	ERJ3GEYJ103	10k	
R166	ERJ3GEYJ103	10k	
R167	ERJ3GEYJ103	10k	
R168	ERJ3GEYJ103	10k	
R169	ERJ3GEYJ103	10k	
R170	ERJ3GEYJ103	10k	
R177	ERJ3GEYJ103	10k	
R178	ERJ3GEYJ103	10k	
R179	ERJ3GEYJ103	10k	
R180	ERJ3GEYJ103	10k	
R181	ERJ3GEYJ103	10k	
R182	ERJ3GEYJ103	10k	
R189	ERJ3GEYJ103	10k	
R190	ERJ3GEYJ103	10k	
R191	ERJ3GEYJ103	10k	
R192	ERJ3GEYJ103	10k	
R193	ERJ3GEYJ103	10k	
R199	ERJ3GEYJ103	10k	
R200	ERJ3GEYJ103	10k	
R201	ERJ3GEYJ103	10k	
R202	ERJ3GEYJ103	10k	
R343	ERJ3GEYJ103	10k	
R344	ERJ3GEYJ103	10k	
R345	ERJ3GEYJ103	10k	
		(FILTERS)	
L101	PFVF1A471SG	CERAMIC FILTER	
L102	PFVF1A471SG	CERAMIC FILTER	
L103	PFVF1A471SG	CERAMIC FILTER	
L104	PFVF1A471SG	CERAMIC FILTER	
L105	PFVF1A471SG	CERAMIC FILTER	
L106	PFVF1A471SG	CERAMIC FILTER	
L107	PFVF1A471SG	CERAMIC FILTER	
L108	PFVF1A471SG	CERAMIC FILTER	
L109	PFVF1A471SG	CERAMIC FILTER	
L110	PFVF1A471SG	CERAMIC FILTER	
L111	PFVF1A471SG	CERAMIC FILTER	
L112	PFVF1A471SG	CERAMIC FILTER	
		(OTHER)	
E21	PSHR1276Z	SPACER	

18.5. FIXTURES AND TOOLS

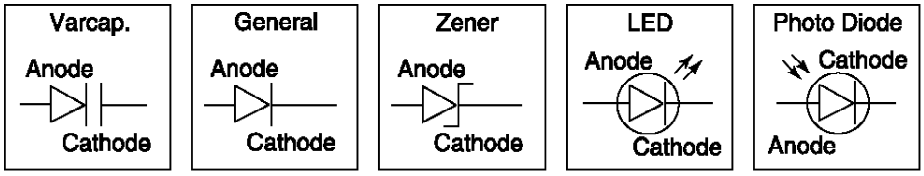
Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PSZZ1TDA100M	EXTENSION BOARD (FOR CPU CARD)	
EC2	PSZZ2TDA100M	EXTENSION BOARD (FOR LINE CARD)	

Note:
EC1 and EC2 are necessity for servicing.

19. FOR THE SCHEMATIC DIAGRAM

Note:

1. **DC voltage measurements are taken with an oscilloscope or a tester with a ground.**
2. **The schematic diagrams and circuit board may be modified at any time with the development of new technology.**



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of there components, use only manufacturer's specified parts.

20. SCHEMATIC DIAGRAM

20.1. MPR CARD

20.2. BACK/LED BOARD

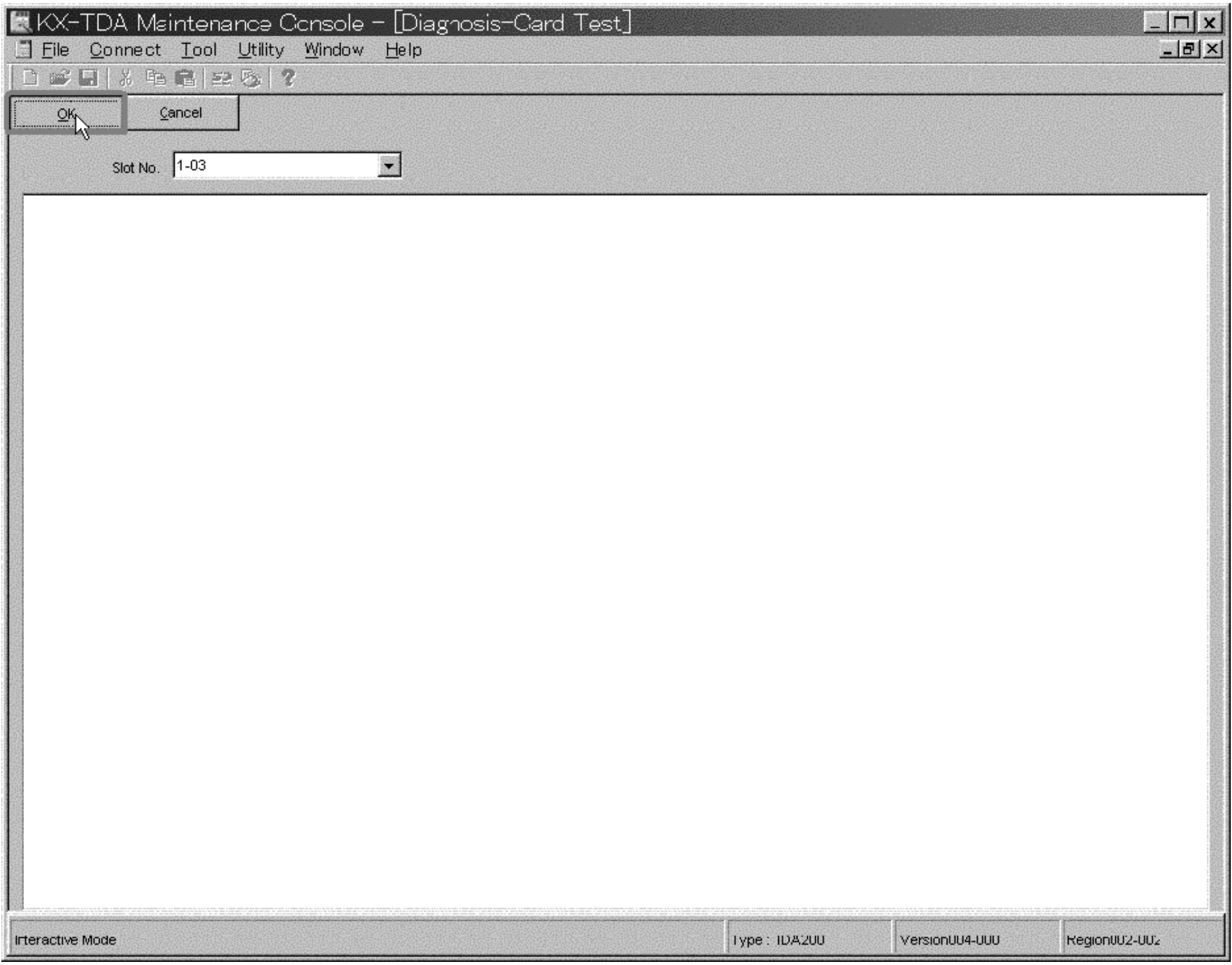
20.3. WAVEFORM

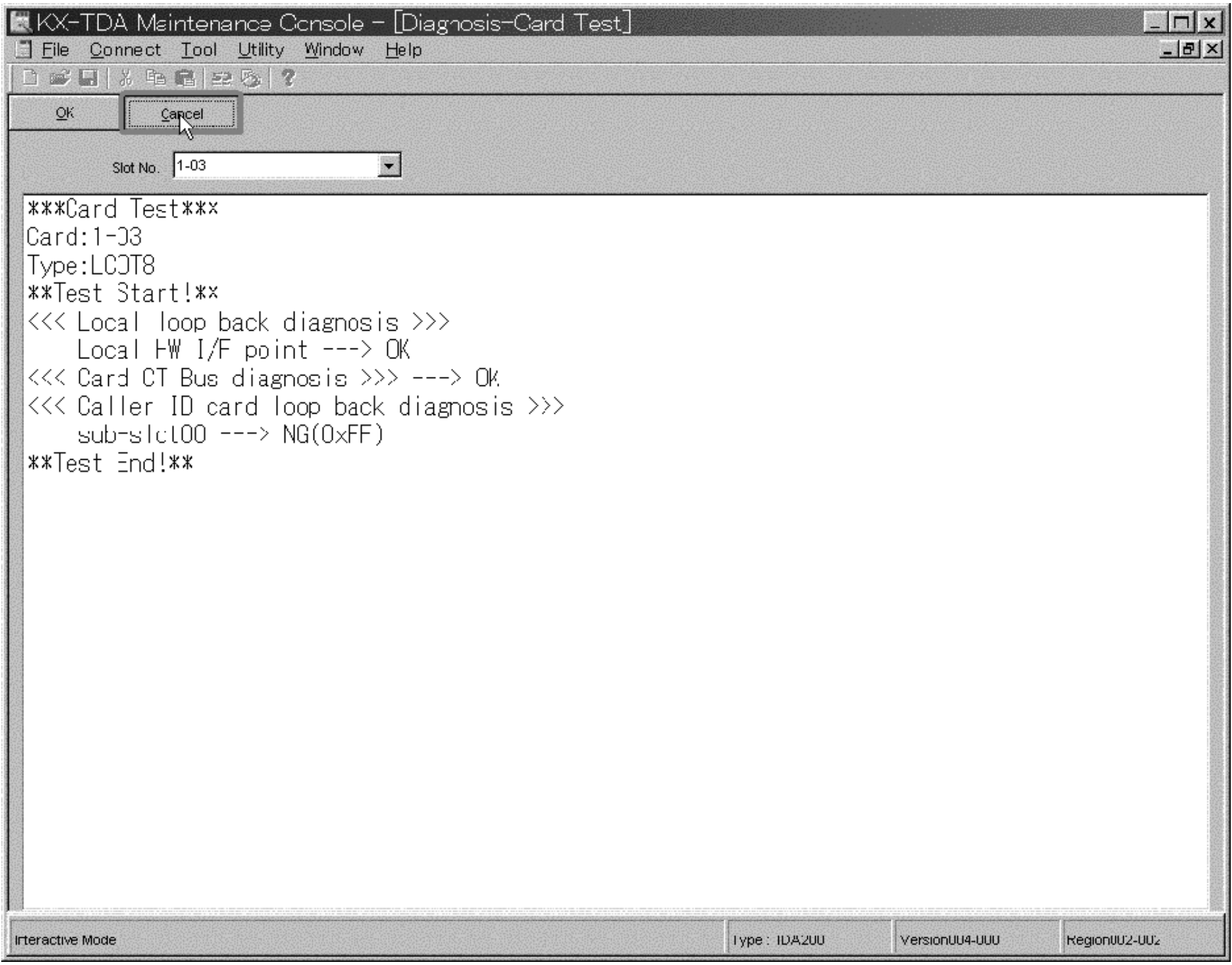
21. PRINTED CIRCUIT BOARD

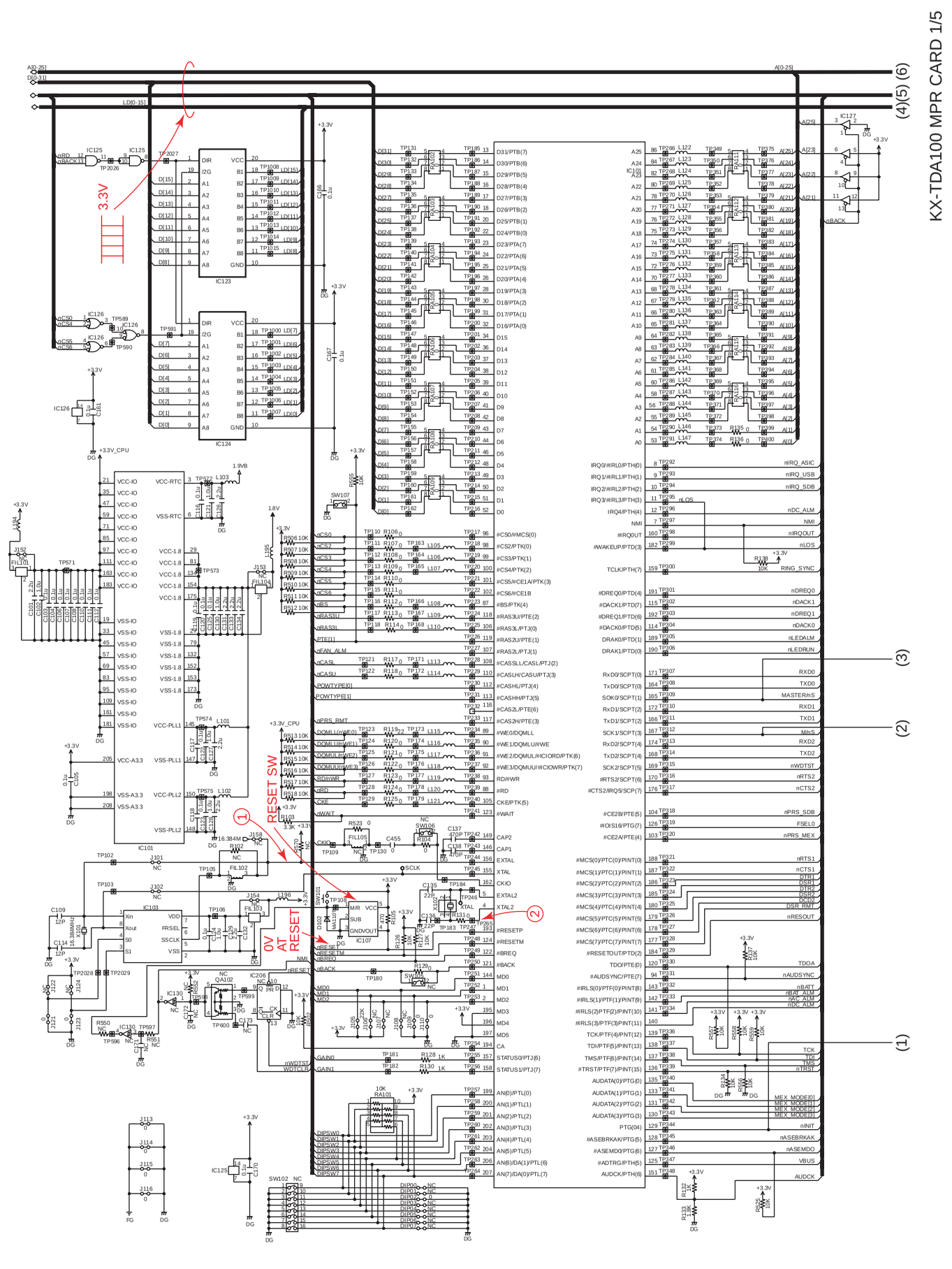
21.1. MPR CARD

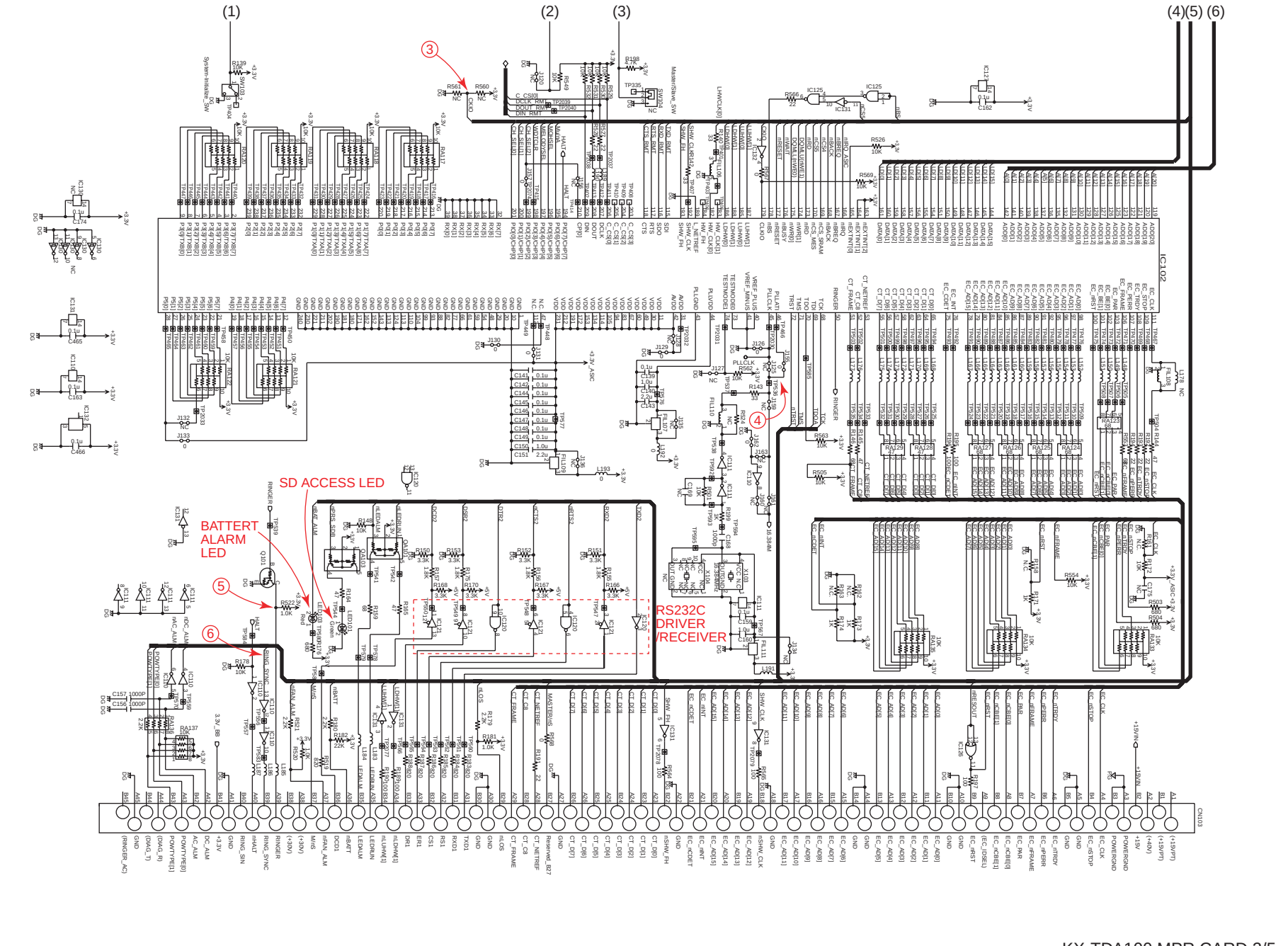
21.2. BACK/LED BOARD

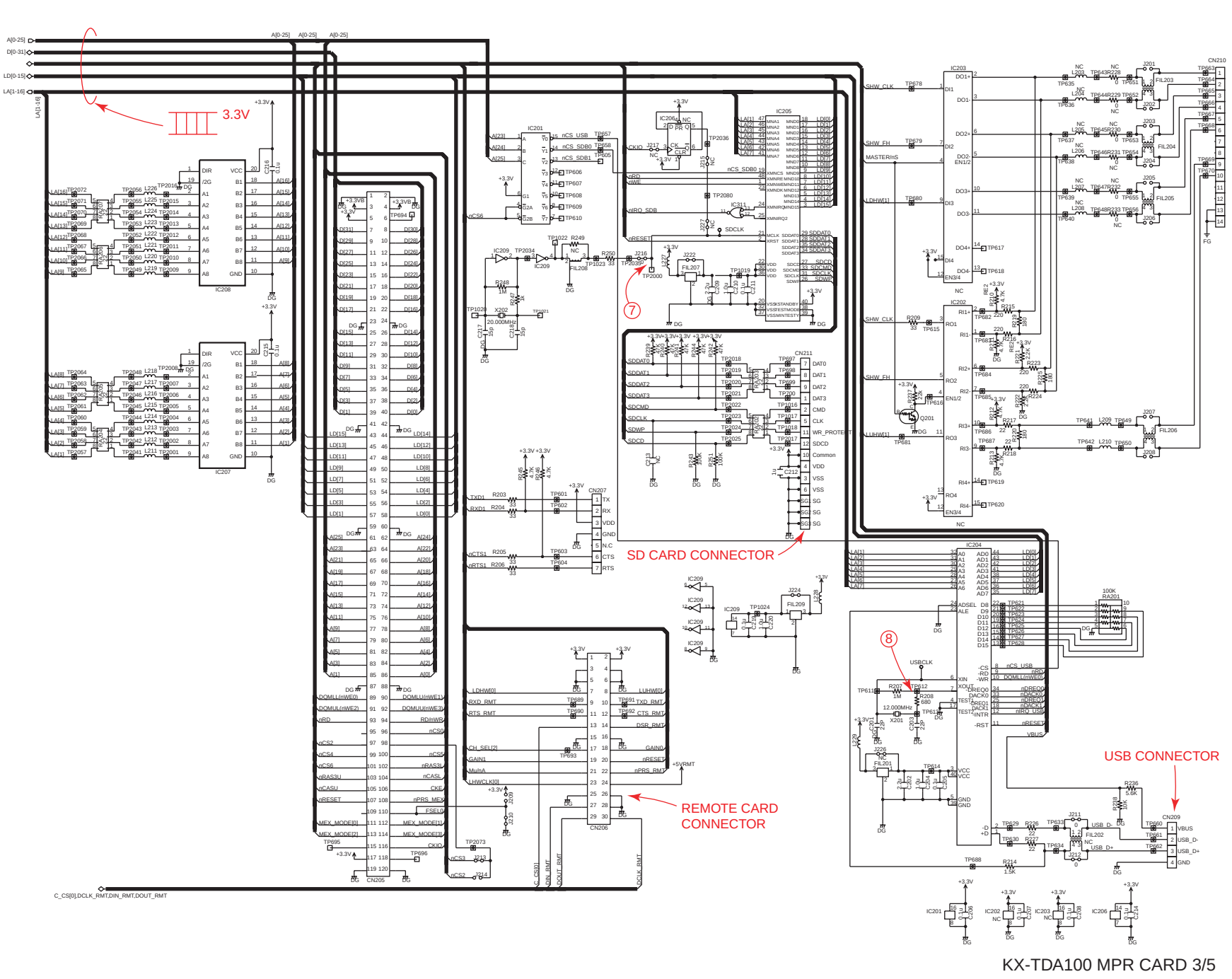
A, / KXTDA100

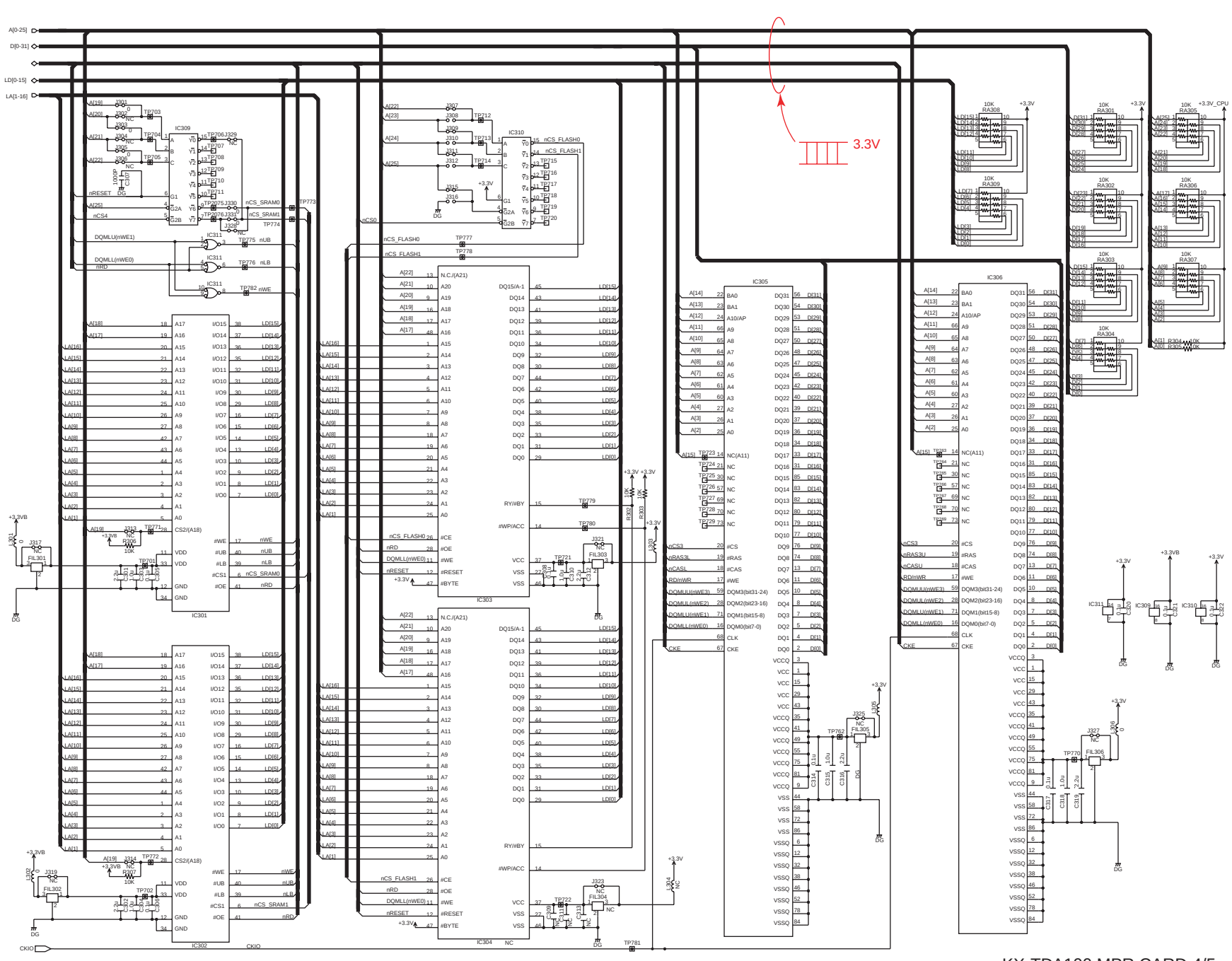

KX-TDA Maintenance Console - [Diagnosis-Card Test]
File Connect Tool Utility Window Help
OK
Cancel
Slot No.
1-03
Interactive Mode
Type : TDA200
Version004-000
Region002-002


KX-TDA Maintenance Console - [Diagnosis-Card Test]
File Connect Tool Utility Window Help
OK
Cancel
Slot No. 1-03
Card Test
Card:1-03
Type:LCOT8
Test Start!
<<< Local loop back diagnosis >>>
Local HW I/F point ---> OK
<<< Card CT Bus diagnosis >>> ---> OK
<<< Caller ID card loop back diagnosis >>>
sub-slot00 ---> NG(0xFF)
Test End!
Interactive Mode
Type : TDA200
Version000-000
Region000-000

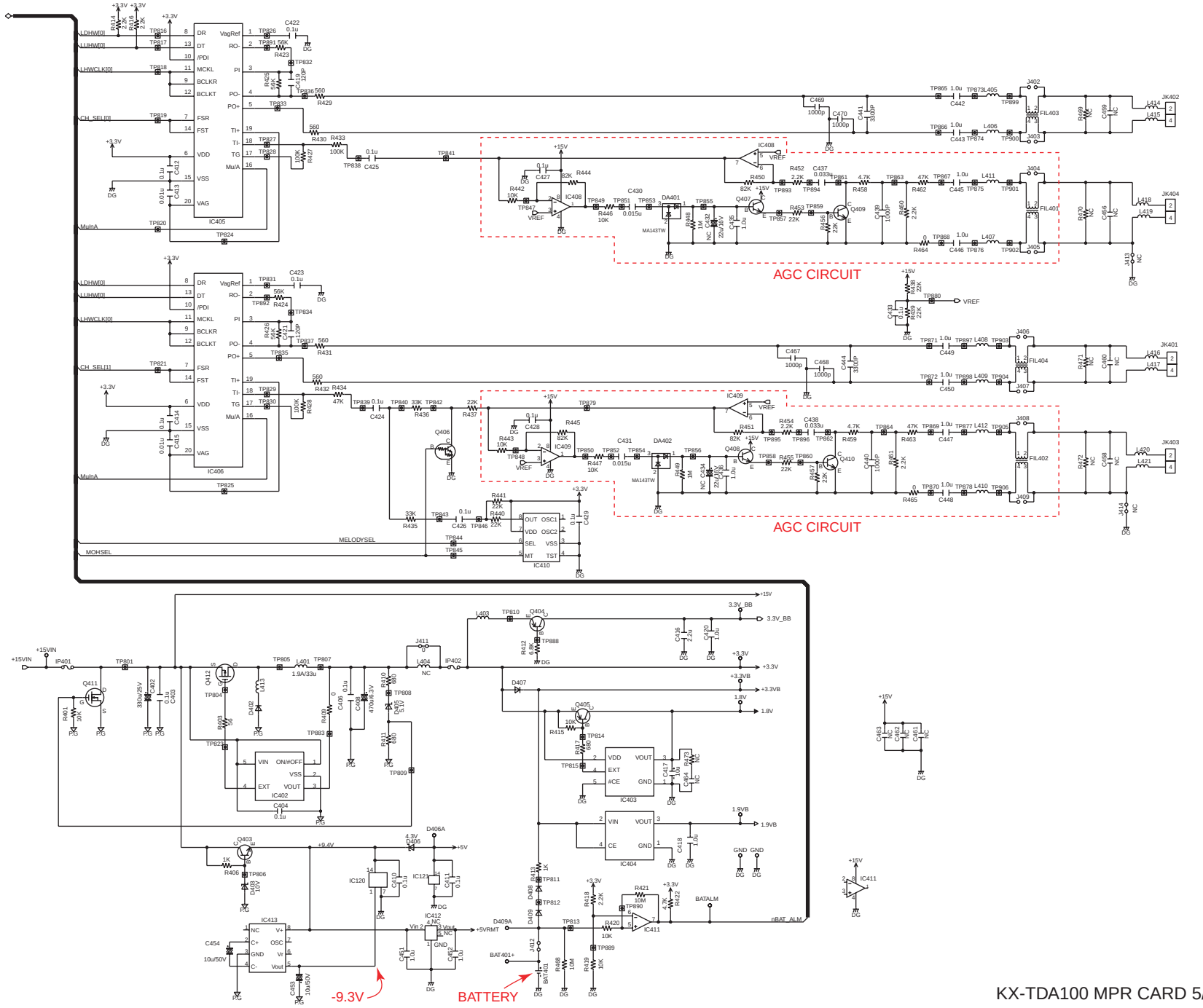

KX-TDA100 MPR CARD 1/5
(4)(5) (6)
(3)
(2)
(1)
RESET SW
0V AT RESET
3.3V
A[0-25]
D[0-31]
LD[0-15]
IC101
IC103
IC123
IC124
IC125
IC126
IC127
IC130
IC206
IC107
IC108
IC109
IC110
IC111
IC112
IC113
IC114
IC115
IC116
IC117
IC118
IC119
IC120
IC121
IC122
IC128
IC129
IC131
IC132
IC133
IC134
IC135
IC136
IC137
IC138
IC139
IC140
IC141
IC142
IC143
IC144
IC145
IC146
IC147
IC148
IC149
IC150
IC151
IC152
IC153
IC154
IC155
IC156
IC157
IC158
IC159
IC160
IC161
IC162
IC163
IC164
IC165
IC166
IC167
IC168
IC169
IC170

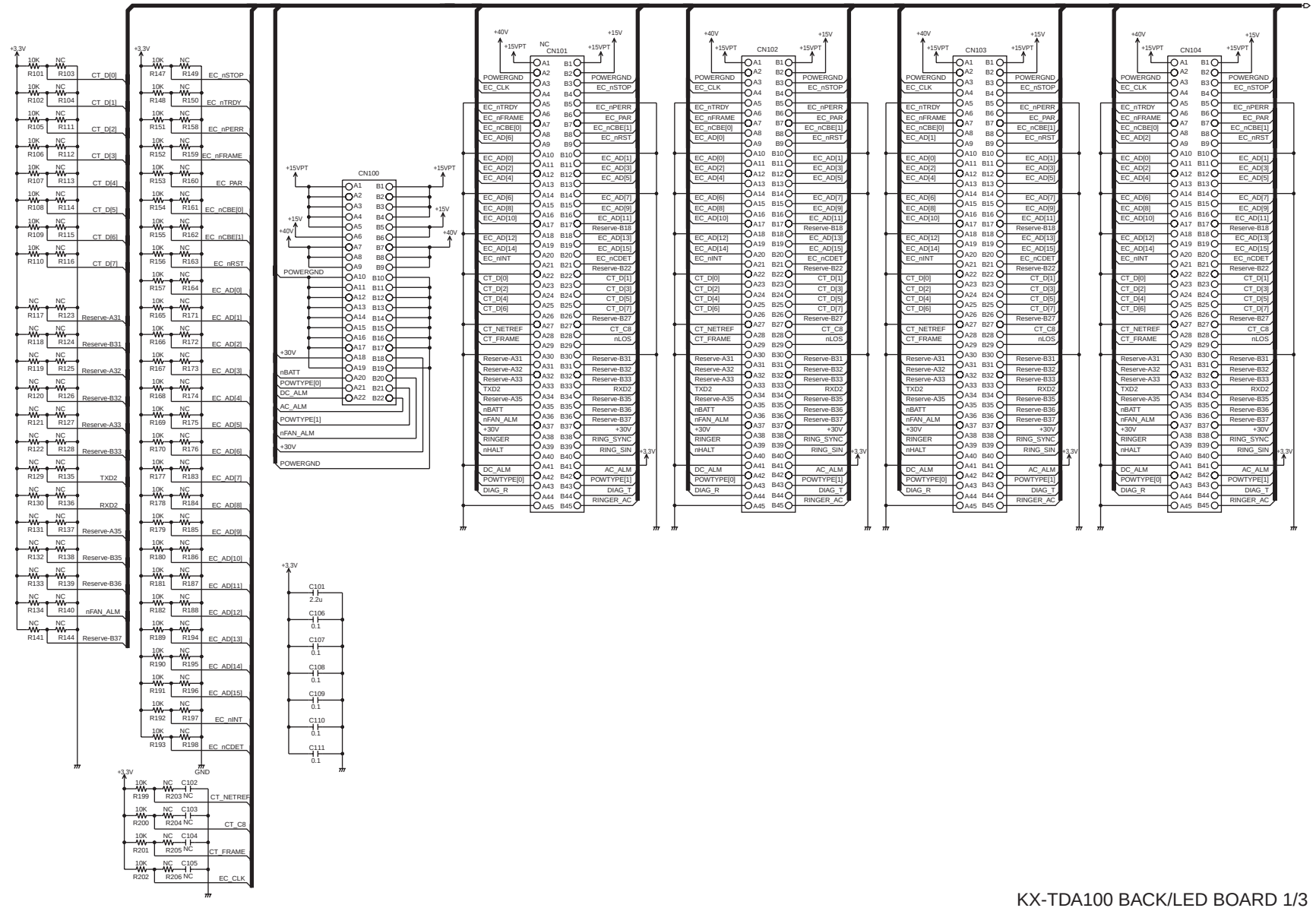

(1)
(2)
(3)
(4)(5) (6)
SD ACCESS LED
BATTERT ALARM LED
RS232C DRIVER /RECEIVER
IC102
CN103


SD CARD CONNECTOR
REMOTE CARD CONNECTOR
USB CONNECTOR
KX-TDA100 MPR CARD 3/5

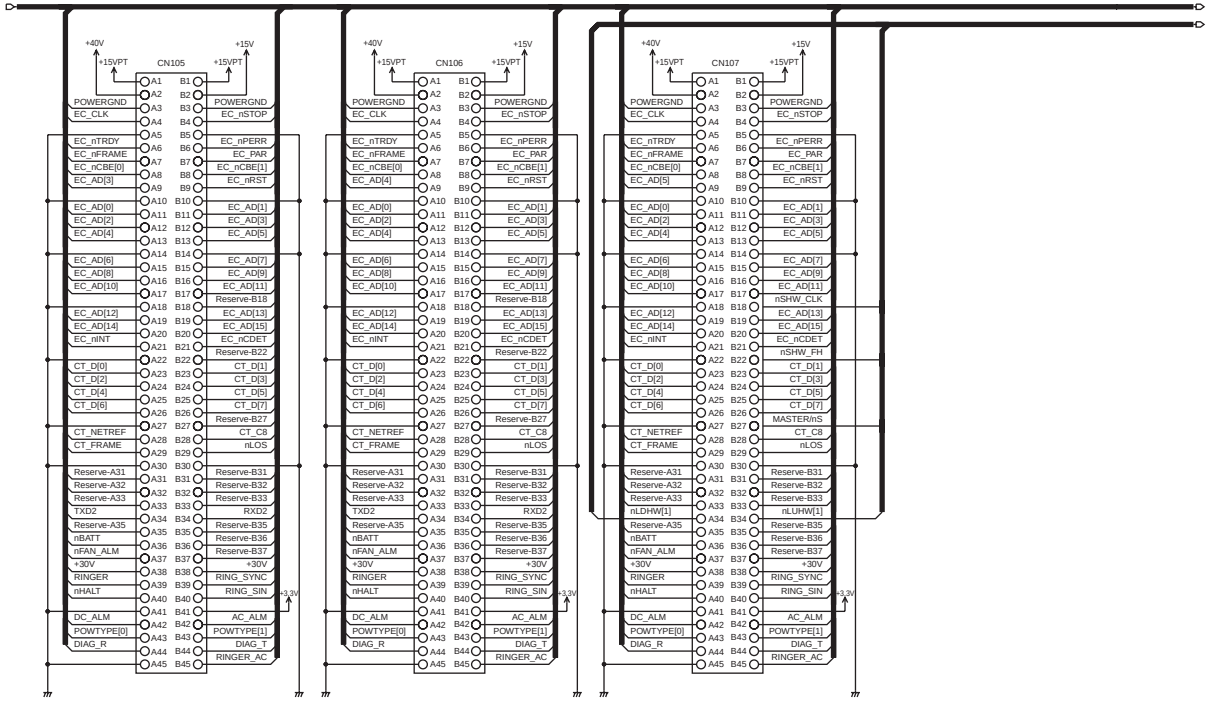


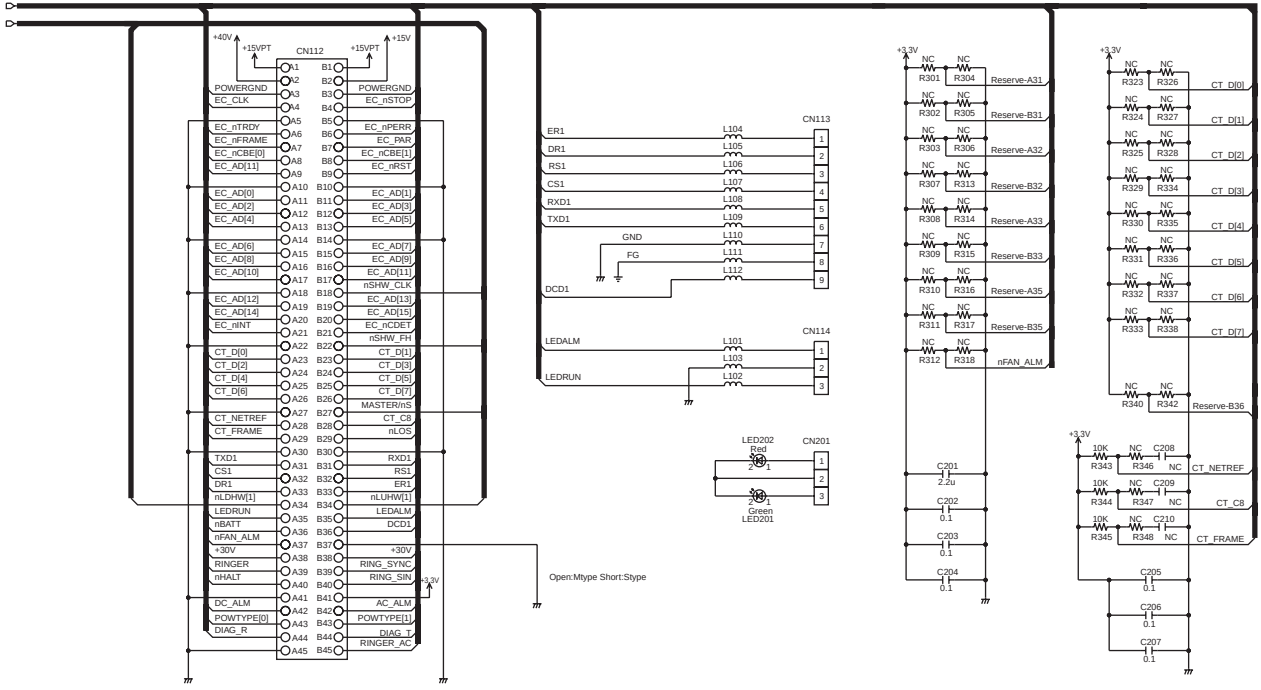
KX-TDA100 MPR CARD 4/5


AGC CIRCUIT
AGC CIRCUIT
-9.3V
BATTERY

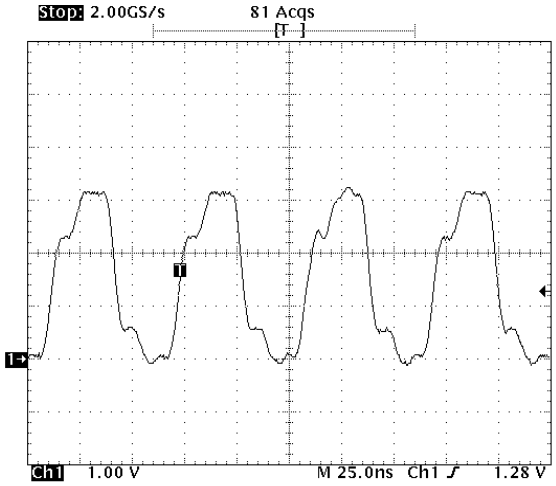


KX-TDA100 BACK/LED BOARD 1/3


CN105
CN106
CN107
+40V
+15V
+15VPT
+3.3V
POWERGND
EC_CLK
EC_nTRDY
EC_nFRAME
EC_nCBE[0]
EC_AD[3]
EC_nSTOP
EC_nPERR
EC_PAR
EC_nCBE[1]
EC_nRST
EC_AD[0]
EC_AD[2]
EC_AD[4]
EC_AD[1]
EC_AD[3]
EC_AD[5]
EC_AD[6]
EC_AD[8]
EC_AD[10]
EC_AD[7]
EC_AD[9]
EC_AD[11]
Reserve-B18
EC_AD[12]
EC_AD[14]
EC_nINT
EC_AD[13]
EC_AD[15]
EC_nCDET
Reserve-B22
CT_D[0]
CT_D[2]
CT_D[4]
CT_D[6]
CT_D[1]
CT_D[3]
CT_D[5]
CT_D[7]
Reserve-B27
CT_NETREF
CT_FRAME
CT_C8
nLOS
Reserve-A31
Reserve-A32
Reserve-A33
TXD2
Reserve-A35
nBATT
nFAN_ALM
+30V
RINGER
nHALT
Reserve-B31
Reserve-B32
Reserve-B33
RXD2
Reserve-B35
Reserve-B36
Reserve-B37
+30V
RING_SYNC
RING_SIN
DC_ALM
POWTYPE[0]
DIAG_R
AC_ALM
POWTYPE[1]
DIAG_T
RINGER_AC
EC_AD[5]
nLDHW[1]
nLUHW[1]
nSHW_CLK
nSHW_FH
MASTER/nS

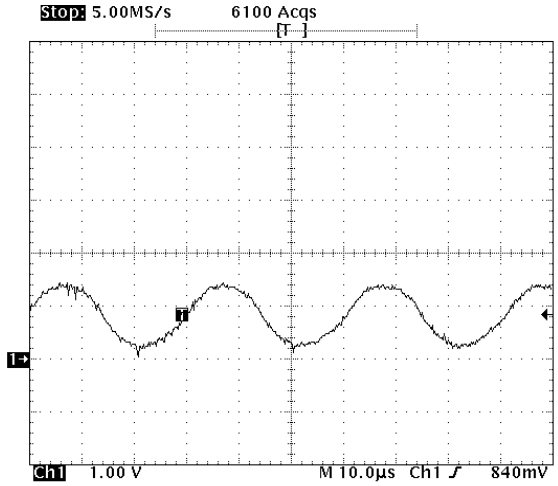

+40V
+15VPT
CN112
+15VPT
+15V
POWERGND
EC_CLK
EC_nTRDY
EC_nFRAME
EC_nCBE[0]
EC_AD[11]
EC_AD[0]
EC_AD[2]
EC_AD[4]
EC_AD[6]
EC_AD[8]
EC_AD[10]
EC_AD[12]
EC_AD[14]
EC_nINT
CT_D[0]
CT_D[2]
CT_D[4]
CT_D[6]
CT_NETREF
CT_FRAME
TXD1
CS1
DR1
nLDHW[1]
LEDRUN
nBATT
nFAN_ALM
+30V
RINGER
nHALT
DC_ALM
POWTYPE[0]
DIAG_R
POWERGND
EC_nSTOP
EC_nPERR
EC_PAR
EC_nCBE[1]
EC_nRST
EC_AD[1]
EC_AD[3]
EC_AD[5]
EC_AD[7]
EC_AD[9]
EC_AD[11]
nSHW_CLK
EC_AD[13]
EC_AD[15]
EC_nCDET
nSHW_FH
CT_D[1]
CT_D[3]
CT_D[5]
CT_D[7]
MASTER/nS
CT_C8
nLOS
RXD1
RS1
ER1
nLUHW[1]
LEDALM
DCD1
+30V
RING_SYNC
RING_SIN
+3.3V
AC_ALM
POWTYPE[1]
DIAG_T
RINGER_AC
Open:Mtype Short:Stype
ER1
DR1
RS1
CS1
RXD1
TXD1
GND
FG
DCD1
L104
L105
L106
L107
L108
L109
L110
L111
L112
CN113
LEDALM
LEDRUN
L101
L103
L102
CN114
LED202
Red
Green
LED201
CN201
+3.3V
NC
R301
R304
Reserve-A31
R302
R305
Reserve-B31
R303
R306
Reserve-A32
R307
R313
Reserve-B32
R308
R314
Reserve-A33
R309
R315
Reserve-B33
R310
R316
Reserve-A35
R311
R317
Reserve-B35
R312
R318
nFAN_ALM
C201
2.2u
C202
0.1
C203
0.1
C204
0.1
+3.3V
R323
R326
CT_D[0]
R324
R327
CT_D[1]
R325
R328
CT_D[2]
R329
R334
CT_D[3]
R330
R335
CT_D[4]
R331
R336
CT_D[5]
R332
R337
CT_D[6]
R333
R338
CT_D[7]
R340
R342
Reserve-B36
+3.3V
10K
R343
R346
C208
CT_NETREF
R344
R347
C209
CT_C8
R345
R348
C210
CT_FRAME
C205
0.1
C206
0.1
C207
0.1

Waveform ①



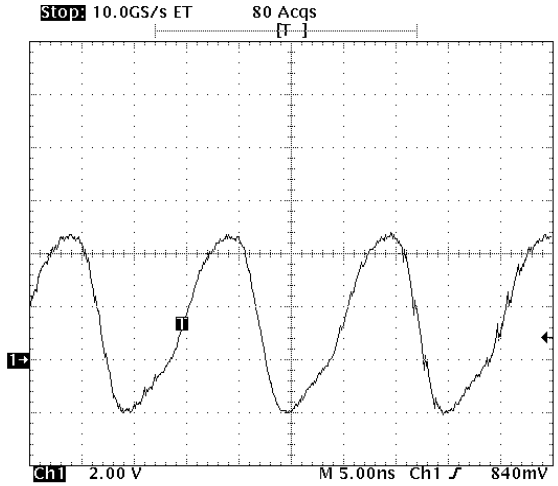
16.384MHz

Waveform ②



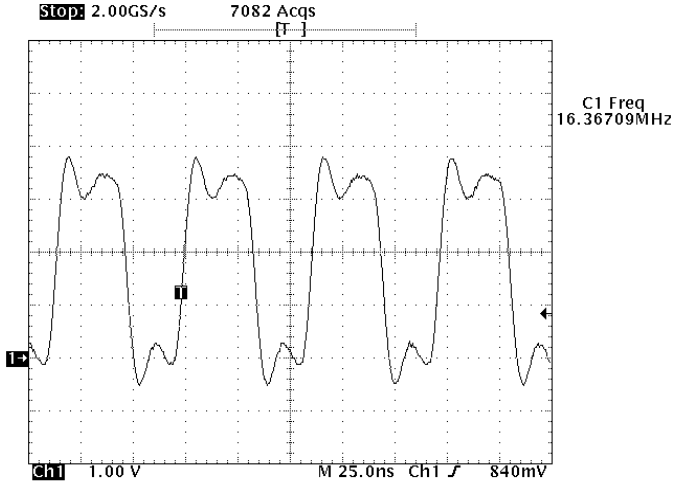
32.768kHz

Waveform ③



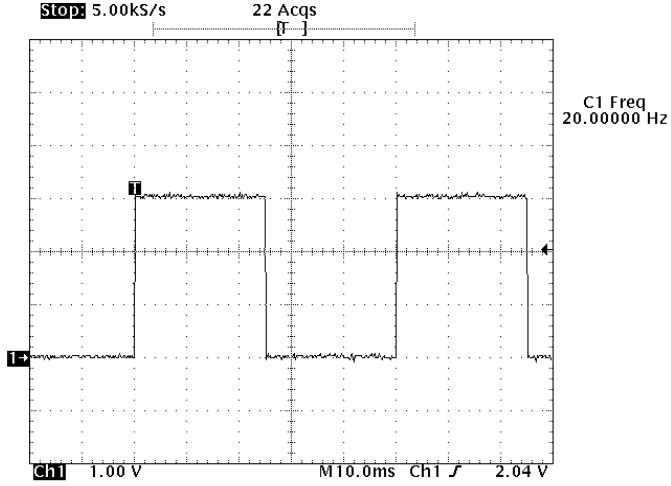
65.536MHz

Waveform ④



16.384MHz

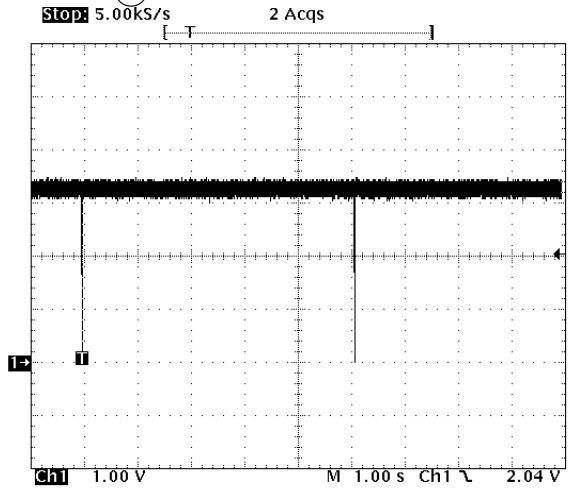
Waveform ⑤



Switching the frequency of 20Hz/25Hz is possible by the soft setting.

The abobe-mentioned waveform is the example of 20Hz.

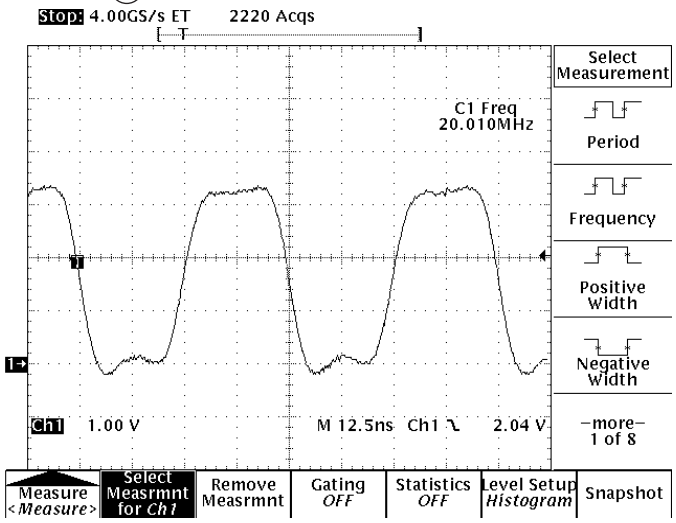
Waveform ⑥



Switching the pulse spacing of 2976msec/3840msec /4992msec/5120msec is possible by the soft setting.

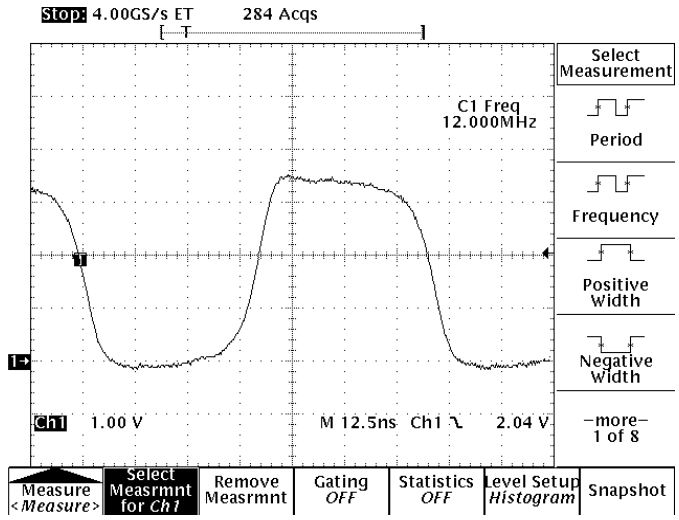
The abobe-mentioned waveform is the example of 5120msec.

Waveform ⑦

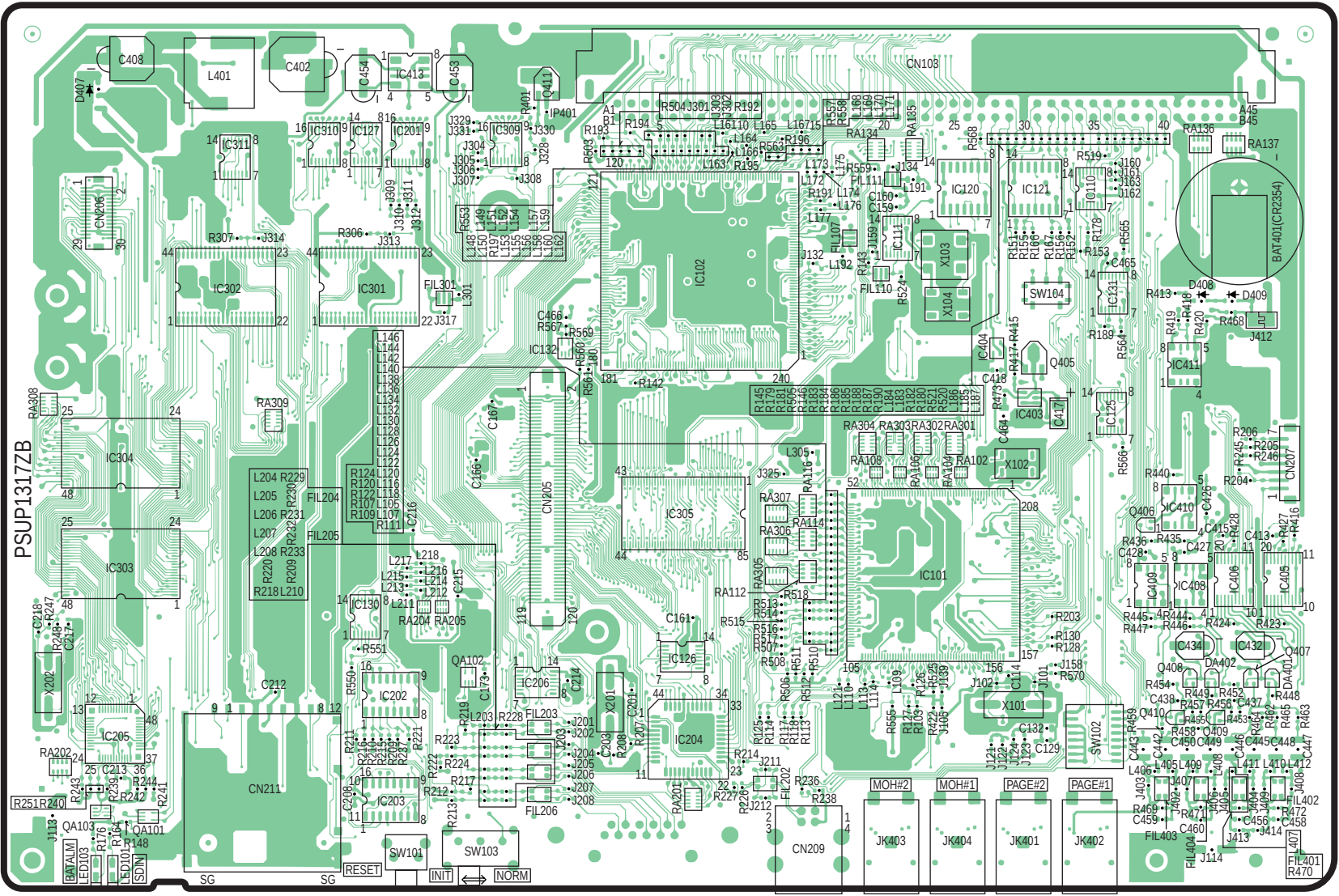


20MHz

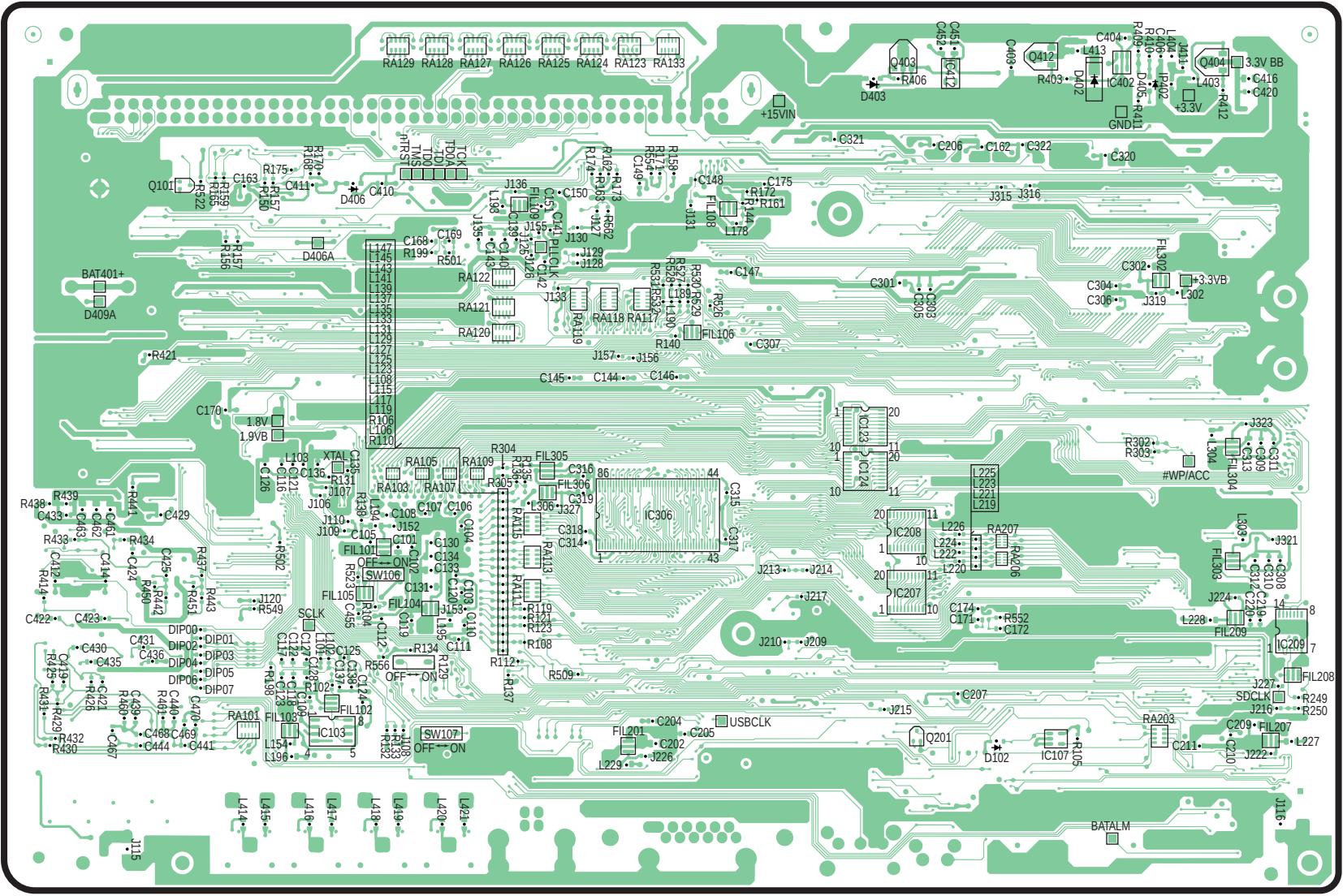
Waveform ⑧



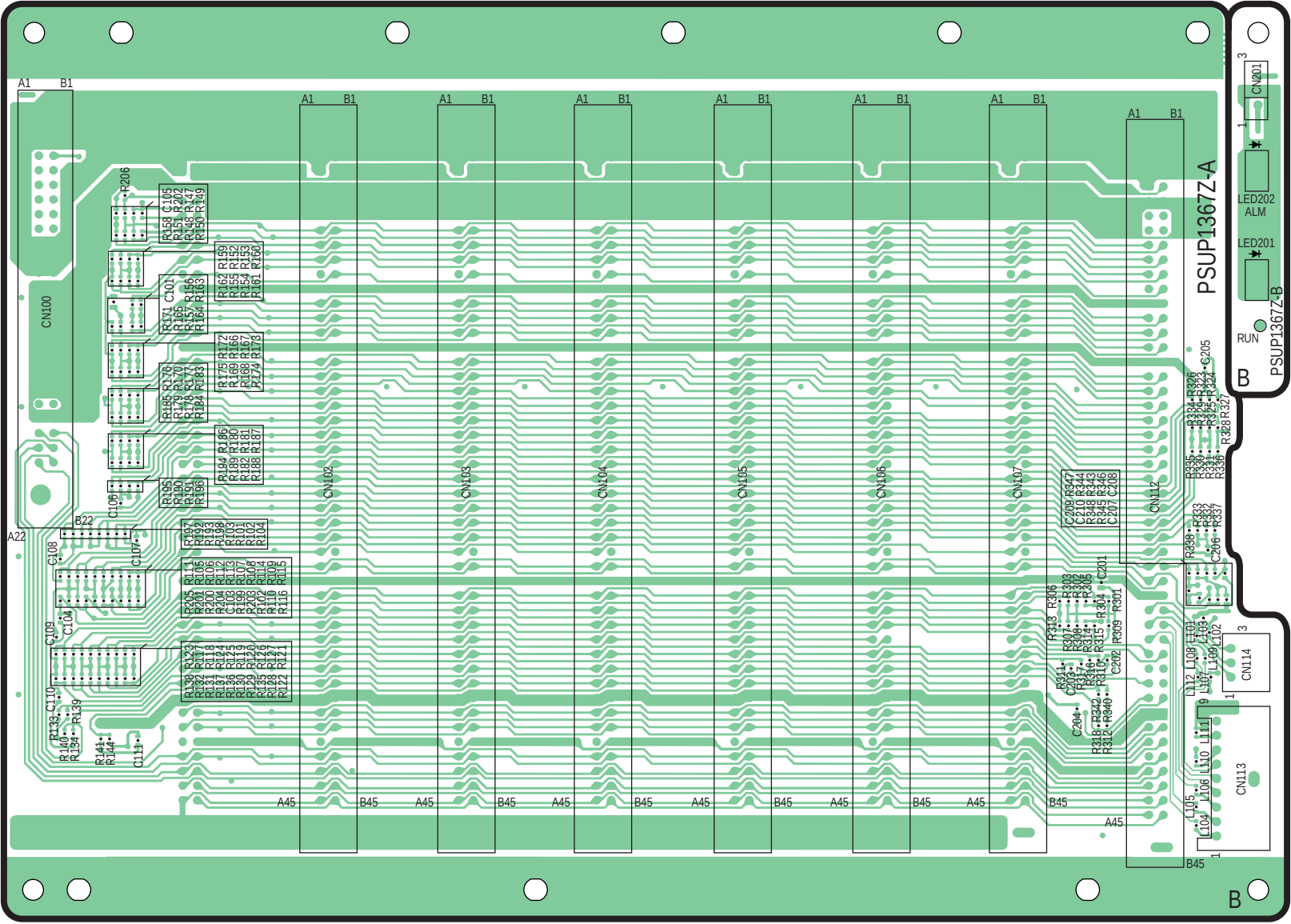
12MHz



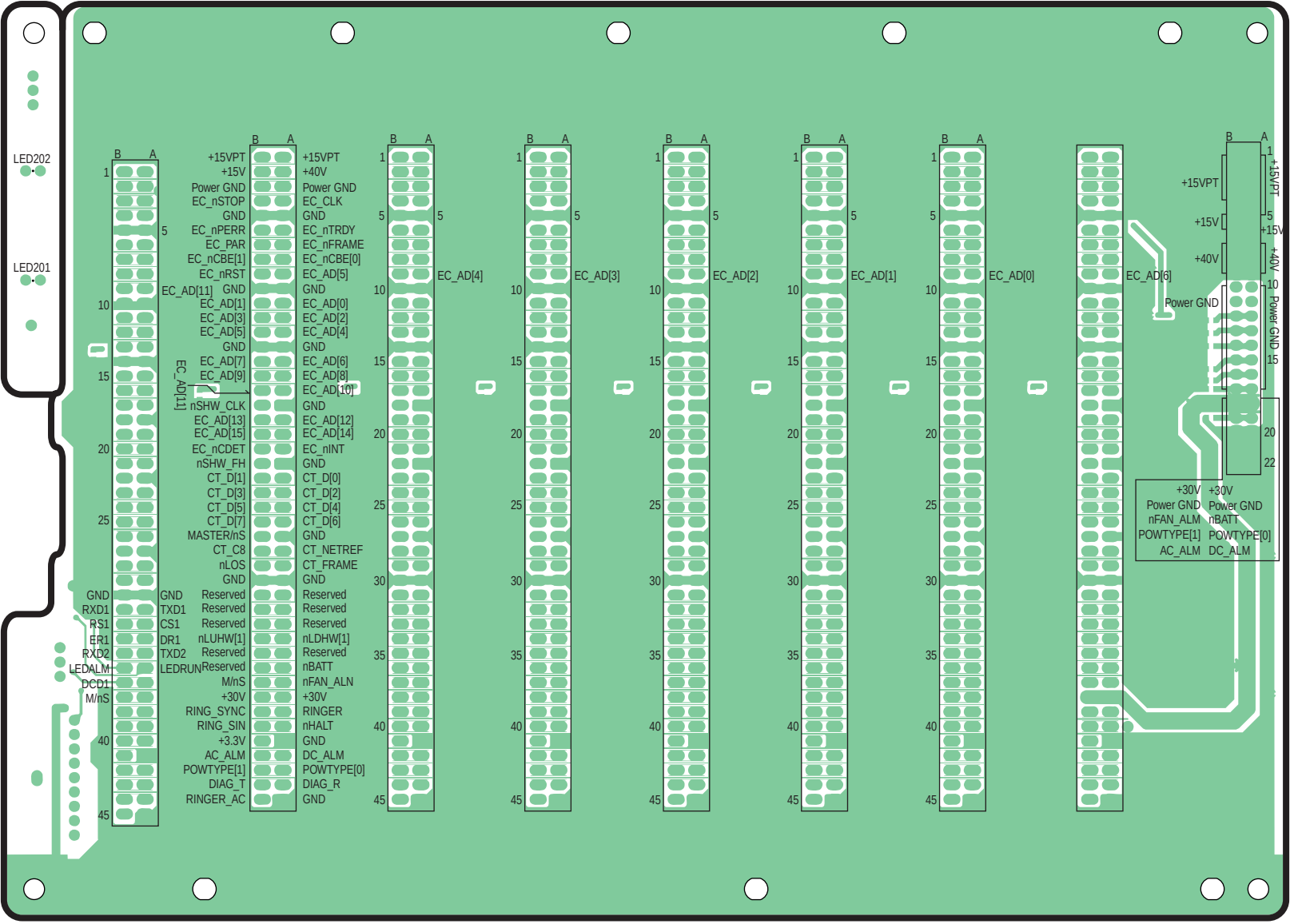
KX-TDA100 MPR CARD COMPONENT VIEW



KX-TDA100 MPR CARD BOTTOM VIEW

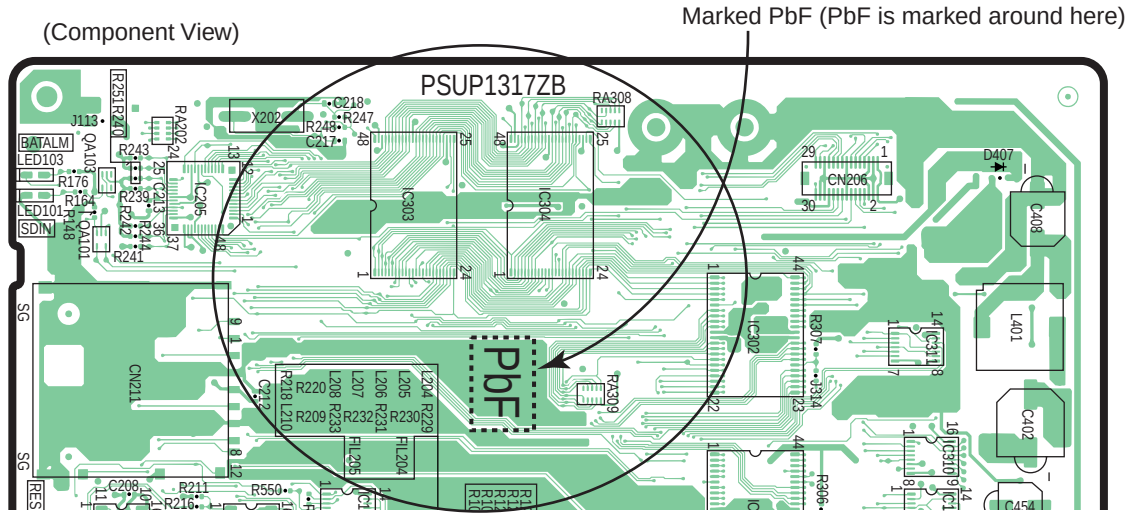


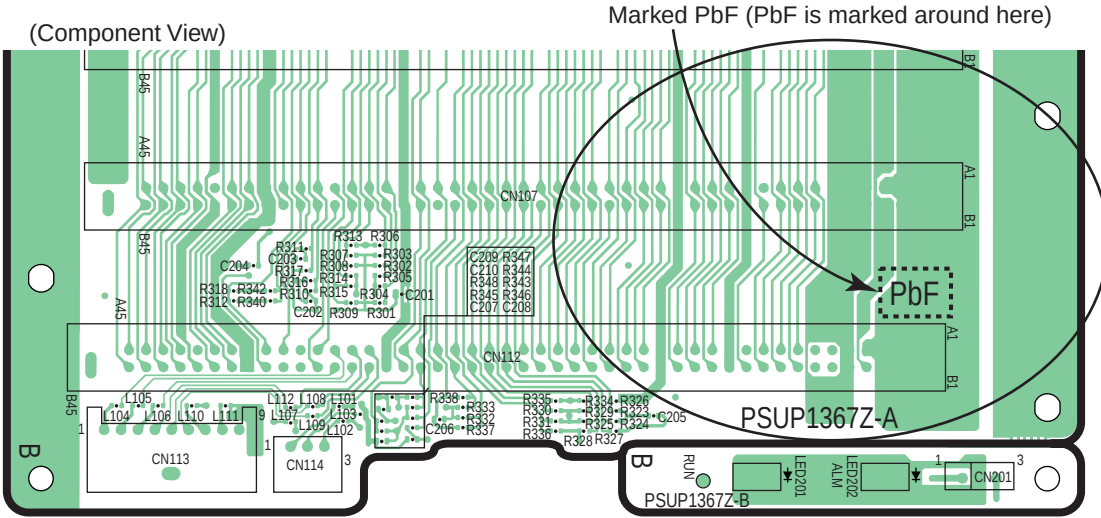
KX-TDA100 BACK/LED BOARD COMPONENT VIEW

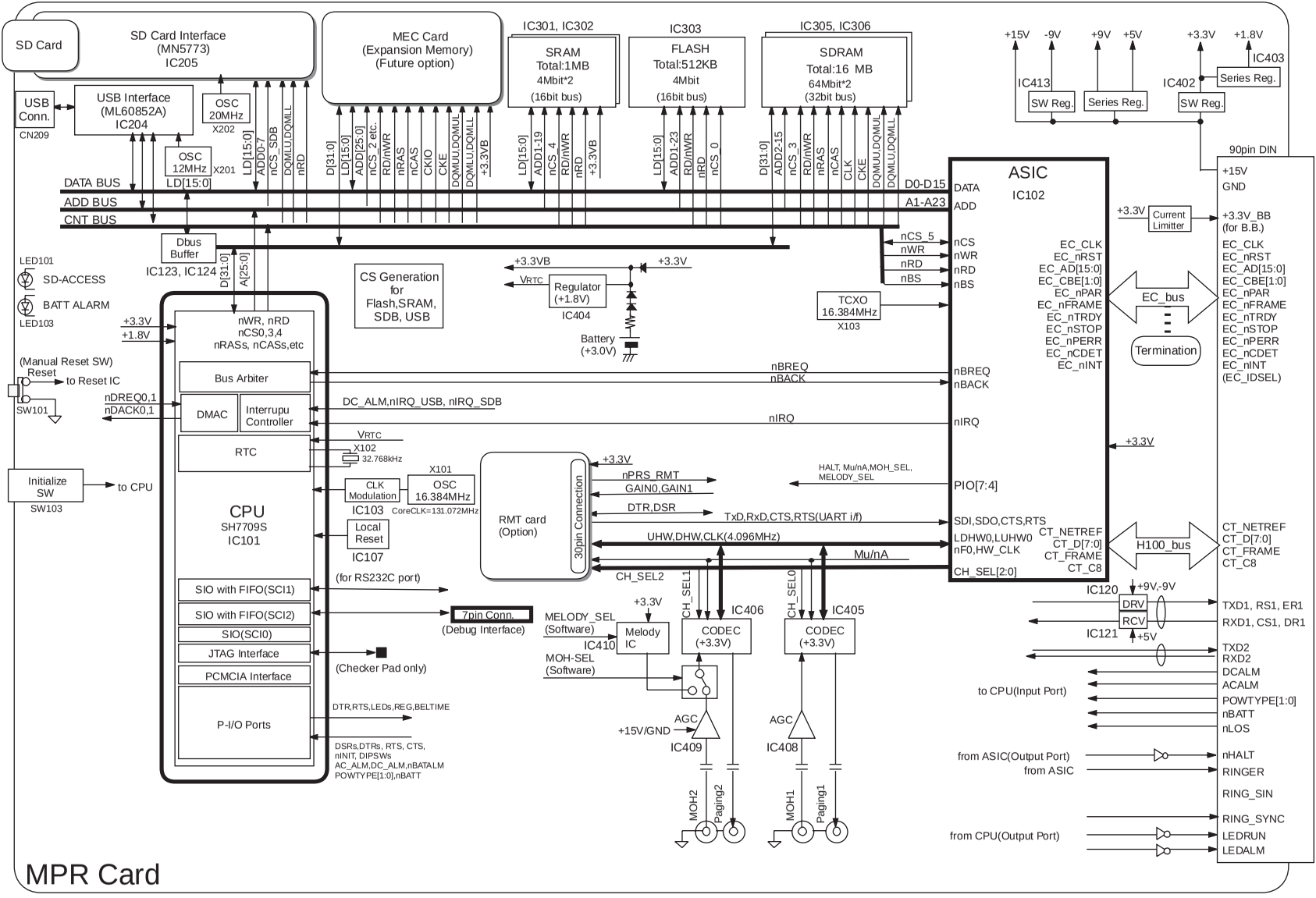


KX-TDA100 BACK/LED BOARD BOTTOM VIEW

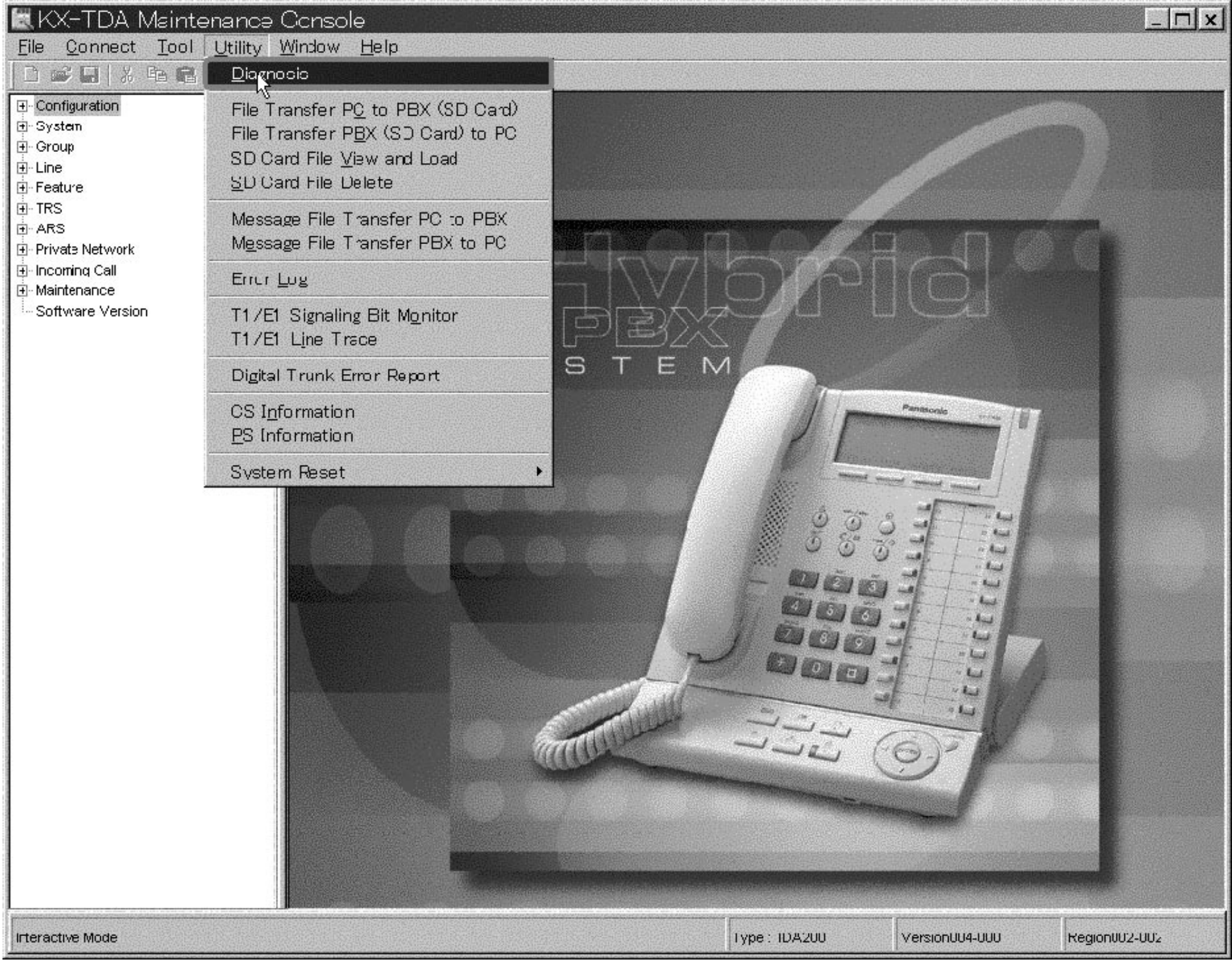
(Component View)

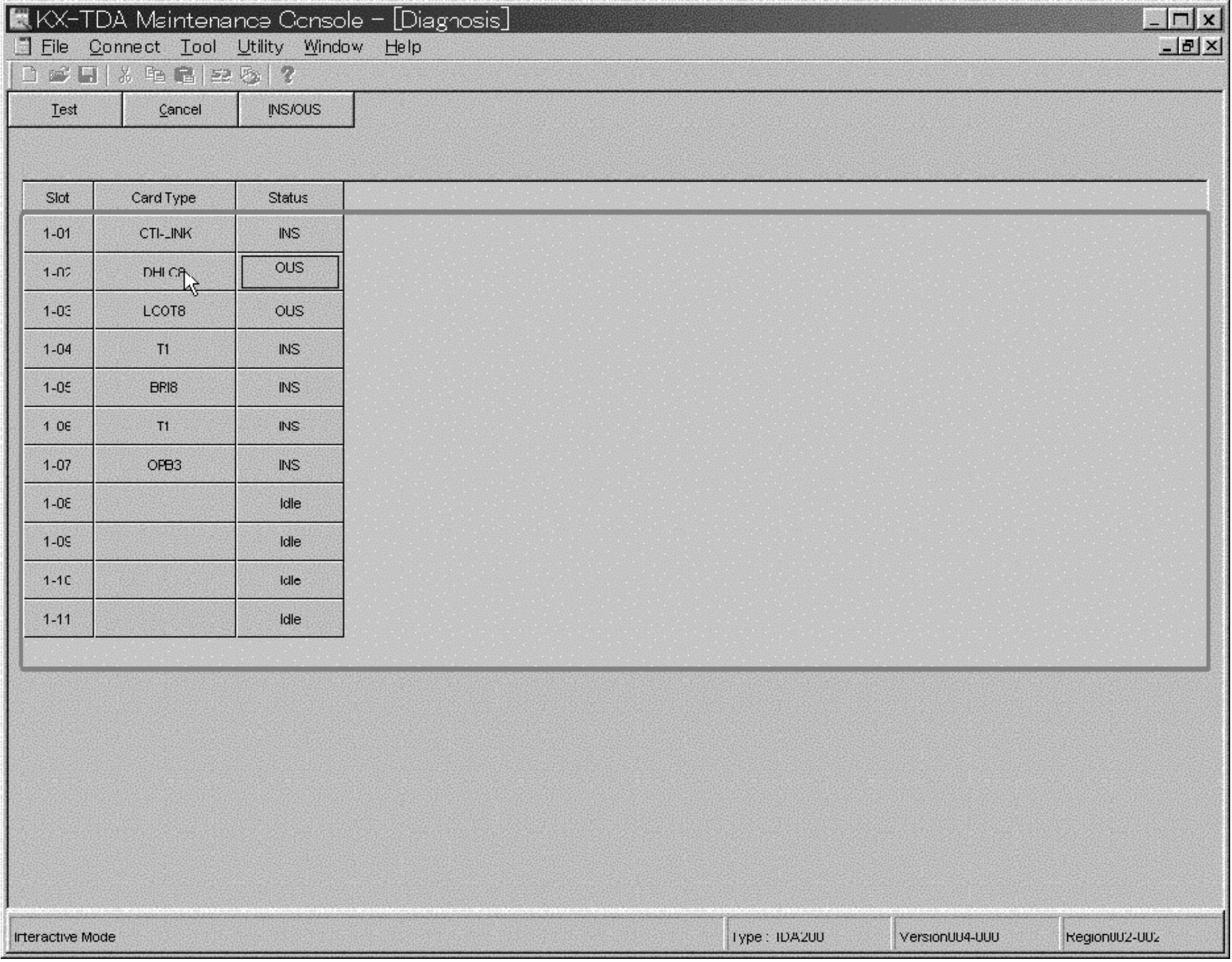


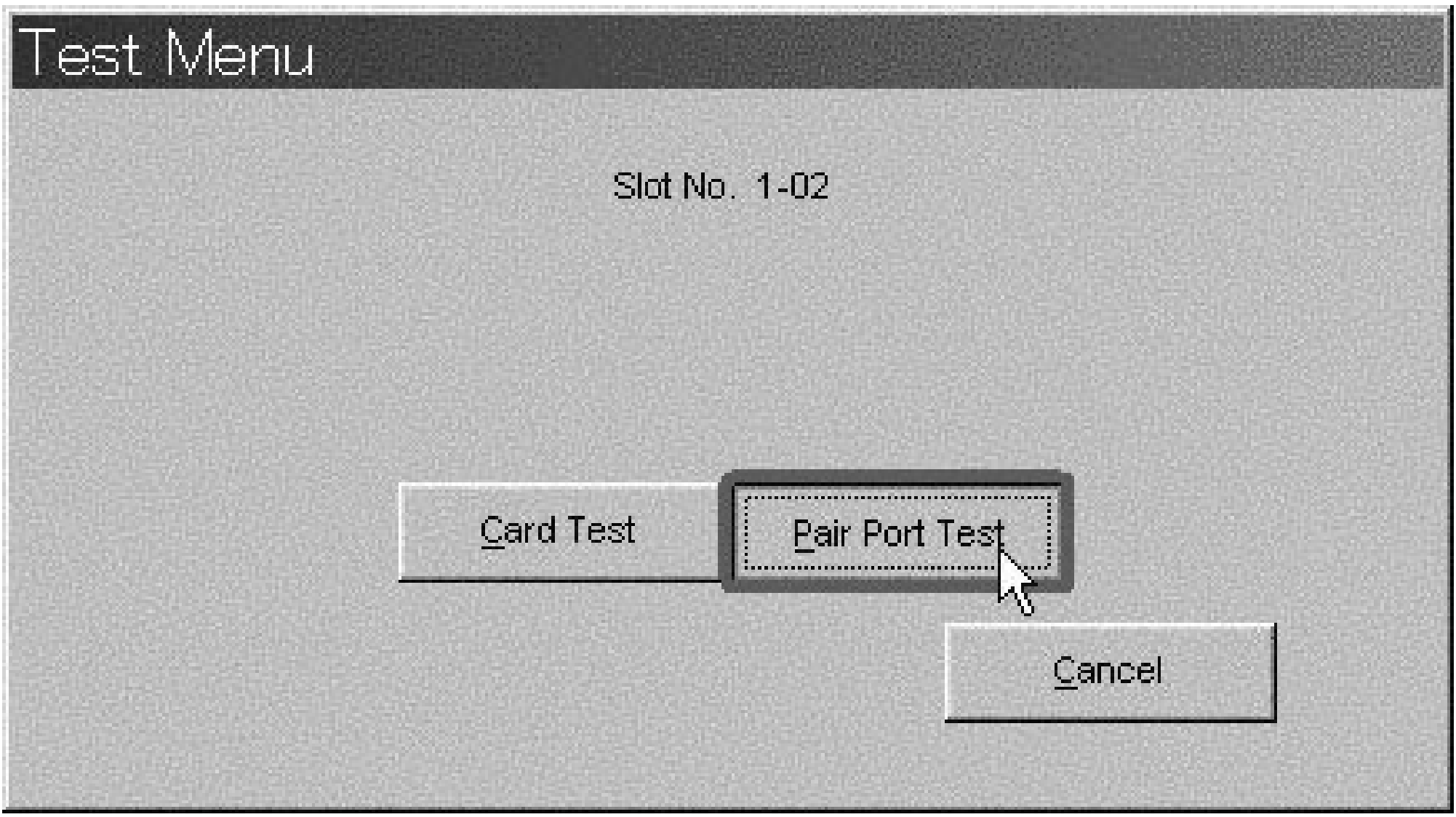

(Component View)
Marked PbF (PbF is marked around here)
PbF
PSUP1367Z-A
PSUP1367Z-B
CN107
CN112
CN113
CN114
CN201
RUN
LED201
LED202
ALM
B45
A45
B7
A1
B1

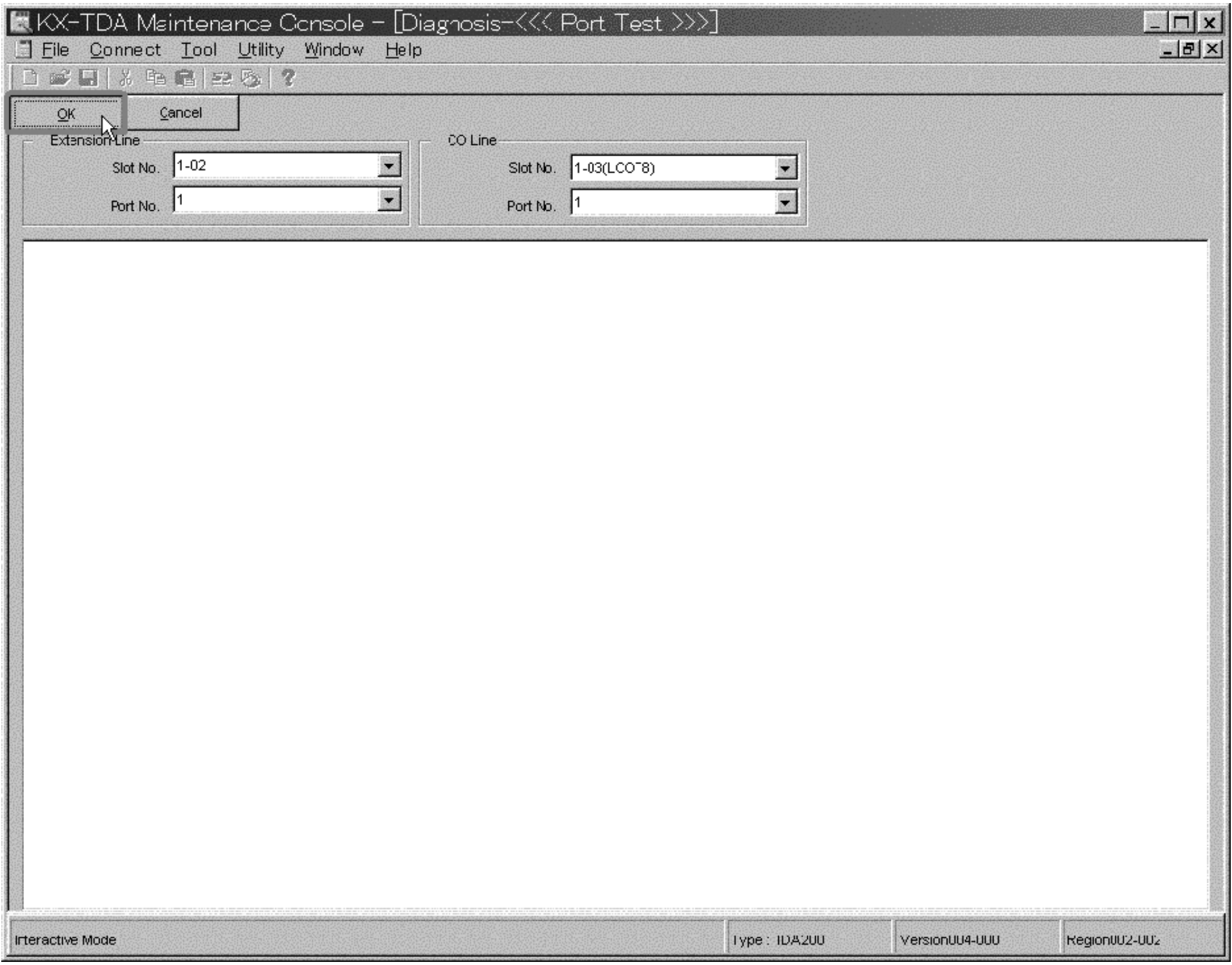


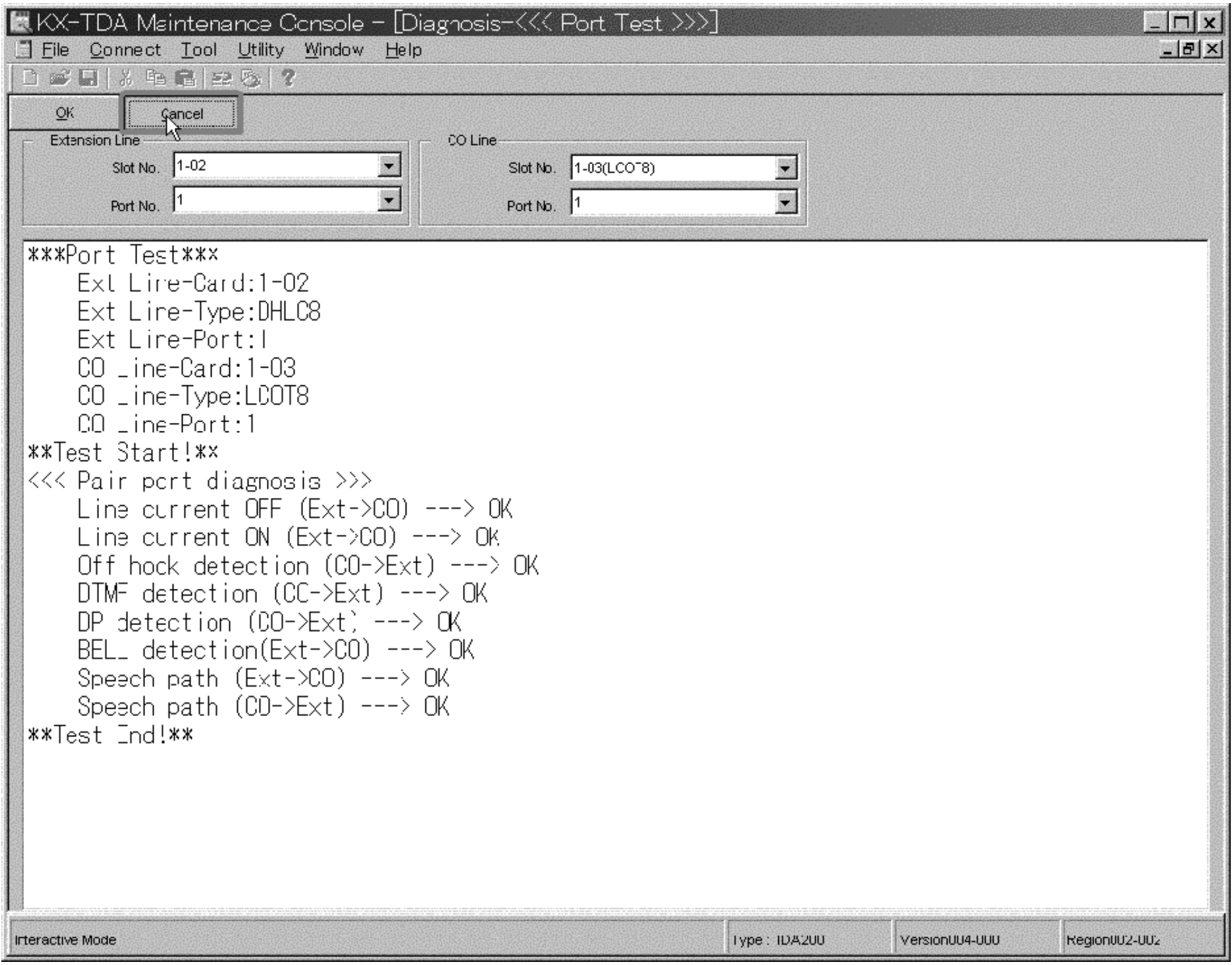
KX-TDA100 MPR CARD BLOCK DIAGRAM

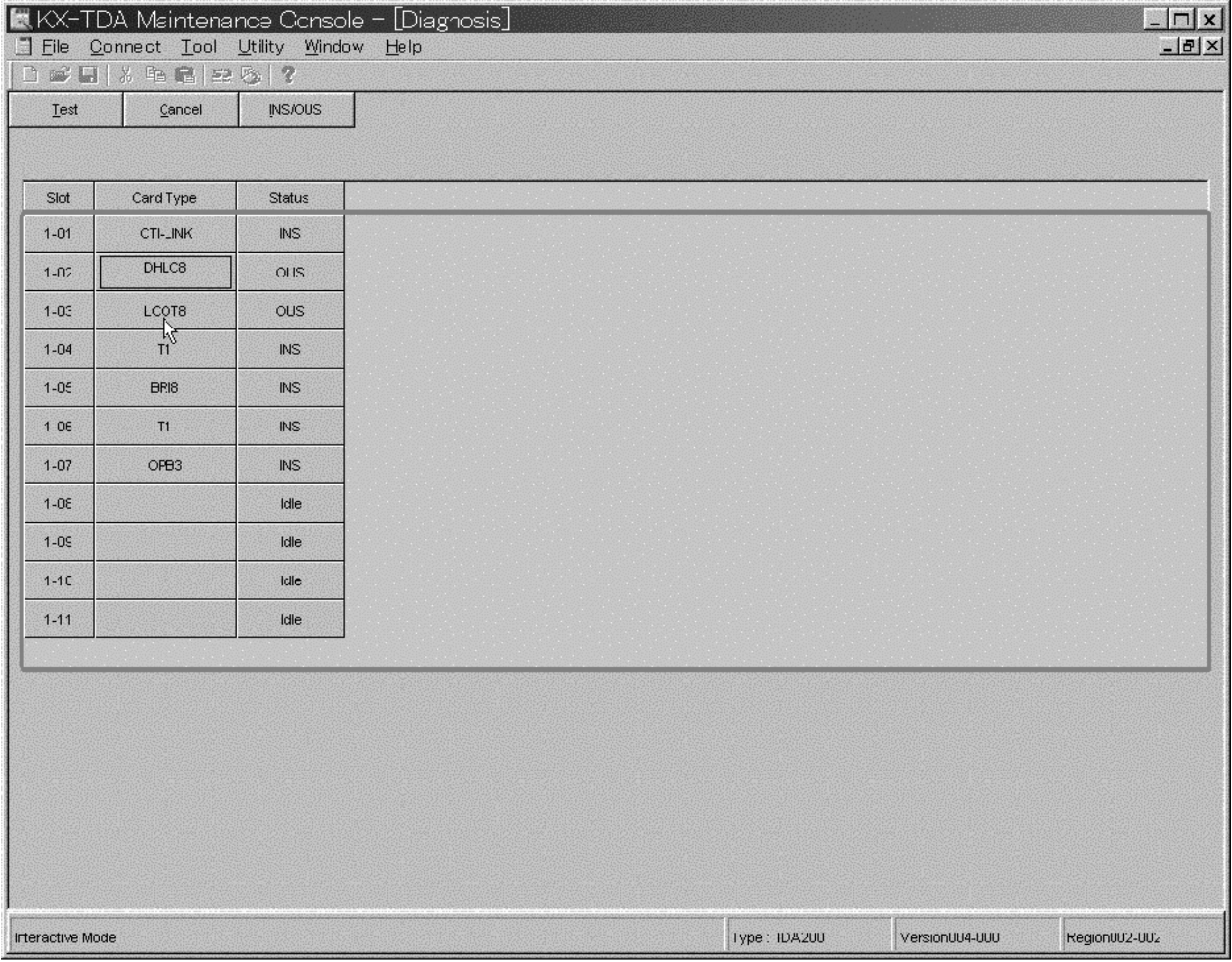

KX-TDA Maintenance Console
File Connect Tool Utility Window Help
Diagnostic
File Transfer PC to PBX (SD Card)
File Transfer PBX (SD Card) to PC
SD Card File View and Load
SD Card File Delete
Message File Transfer PC to PBX
Message File Transfer PBX to PC
Error Log
T1/E1 Signaling Bit Monitor
T1/E1 Line Trace
Digital Trunk Error Report
CS Information
PS Information
System Reset
Configuration
System
Group
Line
Feature
TRS
ARS
Private Network
Incoming Call
Maintenance
Software Version
Hybrid
PBX
STEM
Interactive Mode
Type : TDA200
Version004-000
Region002-002

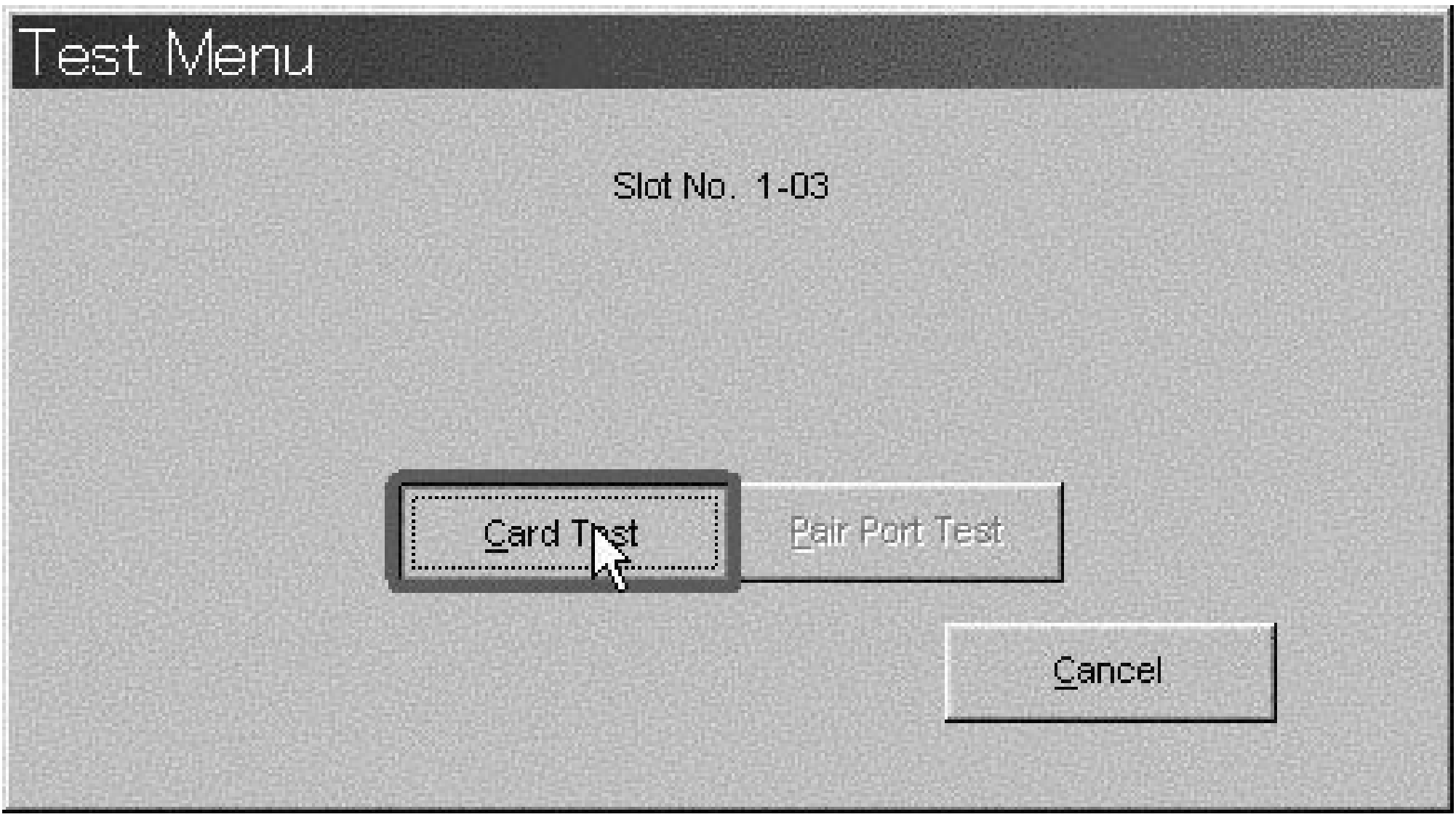

KX-TDA Maintenance Console - [Diagnosis]
File Connect Tool Utility Window Help
Test
Cancel
INS/OUS
Slot
Card Type
Status
1-01 CTI-LINK INS
1-02 DHLC8 OUS
1-03 LCOT8 OUS
1-04 T1 INS
1-05 BRI8 INS
1-06 T1 INS
1-07 OPB3 INS
1-08 Idle
1-09 Idle
1-10 Idle
1-11 Idle
Interactive Mode
Type : TDA200
Version004-000
Region002-002


Test Menu
Slot No. 1-02
Card Test
Pair Port Test
Cancel


KX-TDA Maintenance Console - [Diagnosis-<<< Port Test >>>]
File Connect Tool Utility Window Help
OK
Cancel
Extension Line
Slot No. 1-02
Port No. 1
CO Line
Slot No. 1-03(LCO-8)
Port No. 1
Interactive Mode
Type : TDA200
Version000-000
Region002-002


KX-TDA Maintenance Console - [Diagnosis-<<< Port Test >>>]
File Connect Tool Utility Window Help
OK
Cancel
Extension Line
Slot No. 1-02
Port No. 1
CO Line
Slot No. 1-03(LCOT8)
Port No. 1
Port Test
Ext Line-Card:1-02
Ext Line-Type:DHLC8
Ext Line-Port:1
CO Line-Card:1-03
CO Line-Type:LCOT8
CO Line-Port:1
Test Start!
<<< Pair port diagnosis >>>
Line current OFF (Ext->CO) ---> OK
Line current ON (Ext->CO) ---> OK
Off hook detection (CO->Ext) ---> OK
DTMF detection (CO->Ext) ---> OK
DP detection (CO->Ext) ---> OK
BELL detection(Ext->CO) ---> OK
Speech path (Ext->CO) ---> OK
Speech path (CO->Ext) ---> OK
Test End!
Interactive Mode
Type : TDA200
Version000-000
Region000-000


KX-TDA Maintenance Console – [Diagnosis]
File Connect Tool Utility Window Help
Test
Cancel
INS/OUS
Slot
Card Type
Status
1-01
CTI-LINK
INS
1-02
DHLC8
OUS
1-03
LCOT8
OUS
1-04
T1
INS
1-05
BRI8
INS
1-06
T1
INS
1-07
OPB3
INS
1-08
Idle
1-09
Idle
1-10
Idle
1-11
Idle
Interactive Mode
Type : TDA200
Version000-000
Region002-002


Test Menu
Slot No. 1-03
Card Test
Pair Port Test
Cancel